ELECTRICAL REVIEW

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6th August, 1948

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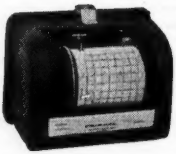

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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXLIII. No. 3689 6th AUGUST, 1948 9d. WEEKLY

Load-Factor Improvement

Immediate and Long-Term Policy

IN frankly recognizing that little can be done to avoid load-shedding next winter through restricting the domestic demand, the Clow Committee, whose Report is reviewed on page 209, has shown a sense of reality that adds weight to its more important long-term proposals. Its main recommendation to meet immediate needs (which has been adopted by the Minister of Fuel and Power), that the running charge of two-part tariffs shall be higher in the three mid-winter months, is open to objections, but is certainly better than rationing based on previous consumption, which the Committee rejects.

The Price Penalty

The efficacy of the price penalty will, we believe, depend largely on response by consumers to the vigorous publicity advocated. The force of the appeal will no doubt be strengthened by confining its incidence to the most critical period. To this the giving of some assurance as to more regular supplies of domestic coal is an essential adjunct, even though—as an emergency measure—it runs counter to the view expressed by the Minister that use of inferior grades of coal (as in the generation of electricity) should be encouraged so as to conserve the better qualities for export. Explanations to consumers, which will be very necessary, should clearly differentiate between plant shortage and true fuel economy in regard to its type and should not create the impression that peaks at other times of the year are of small consequence. It would have been instructive if the amount of plant out of commission for overhaul from time to time had been shown on the annual load curve.

So much for the immediate emergency. Turning to those recommendations that will take time to carry out, Government spokesmen have expressed the hope that by 1950-51 generating plant capacity will have caught up with the demand. That is to assume that new plant can be commissioned according to plan, despite difficulties in securing requisite labour and material. The capacity expected to be available includes plant normally regarded as obsolete, in which respect 25 years is taken instead of 20 years as formerly. Moreover these estimates do not allow the safety margin which experience has shown to be desirable. The Committee certainly does not overstate the gravity of the position in suggesting that without peak restriction load shedding may continue for more than two years.

Further Investigations Necessary

While the data now available are inadequate for close forecasting, the investigations called for cover methods which have been shown to yield good results on a smaller scale in this country or abroad. These investigations should be put in hand at once. The most important are the extension of centralized control, the quoting for "non-firm" supplies and the development of the thermal storage principle, which would to some extent offset inability to store electricity at the generating end. The aim would be that any inconvenience

caused by interruptions in supply would be more than compensated for by lower prices for such loads.

In assessing the value of alternative means, the cost incurred must be compared with that of providing peak load generating plant and a reference to gas turbines for this duty indicates that the Committee is looking someway ahead. While adequate power station capacity provides the only real safeguard, its use over a greater number of hours in the year would have far-reaching effects on the price of electricity. When the appointment of the Clow Committee was announced in March, we drew attention to the opportunity afforded of making a positive approach to the problem by improving plant load factor that would be of permanent value. The long-term recommendations of the Report and their implications will remain valid when present troubles are only a memory.

Consumer Sampling

ALTHOUGH there is, thanks to the Electricity Commissioners, plenty of statistical data about electrical production and distribution, the information available on consumers is scanty. This is understandable, since the technique for coping with this more complex problem has only gradually been evolved. Nevertheless knowledge is necessary of such items as installed load, the number of the various appliances in use and their percentage relationship to the possible total, and the proportion of consumers supplied under different forms of tariff, if only in order to provide a scientific basis for forecasting demands. The E.R.A. sampling survey of domestic consumers reviewed on page 205 indicates the correct lines of approach to a study that should become, possibly under the ægis of the B.E.A., a permanent activity.

Irish Revolution

LACK of industry and the backward state of agriculture in Ireland led to large-scale emigration which reduced the population of the country by half in the latter part of the last century and beginning of the present. One of the objects of the rural development scheme upon which the Electricity Supply Board of Eire is now actively engaged is to foster new and attractive sources of rural employment which will halt the flow of people from the country. Indeed, Mr. Morrisey, the Minister of Industry and Commerce, recently expressed the belief that if all the people support the scheme it will go far to achieving an agricultural revolution in Eire whose fruits will be as important to that country as was the industrial revolution to England.

Income Tax and Subscriptions

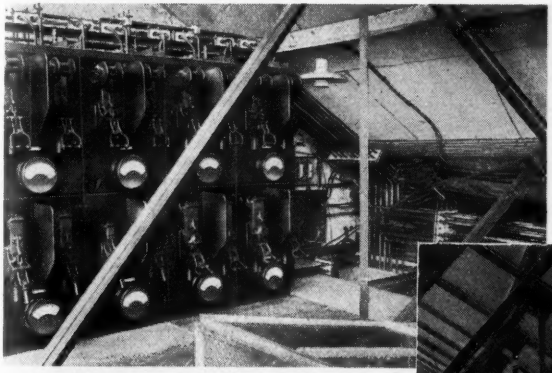
THE brief comment which we subscribed to a letter from "Chartered Electrical Engineer" in our issue of 16th July produced a number of other letters expressing conflicting views. We feel it would be useful to put forward our opinion in greater detail and we do now by saying that an annual subscription to a professional society such as the Institution of Electrical Engineers is in practice usually allowable as a deduction in computing a member's liability to Income Tax under Schedule E in circumstances where membership is an indispensable condition of the tenure of the employment. Such deduction may be claimed at any time within six years after the year of assessment to which it relates. In appropriate cases the matter could probably be placed beyond doubt by membership of the Institution being clearly defined as a condition of appointment and tenure at the time of the appointment or subsequently expressed in a supplementary agreement between the parties.

Trade with Sweden

THE ill wind of Sweden's financial difficulties, which led to the announcement last week of a drastic cut in imports from the United States, will, it is hoped, serve to strengthen the already valuable trade with Great Britain. This was, in fact, emphasized by Herr Gjöres, the Minister of Commerce, who asserted that much that had been imported from America could be obtained from Britain. Although Sweden has a strong electrical manufacturing industry of her own, electrical goods are imported on a considerable scale and these are included in the list of articles that will no longer be purchased from America. In the past six months Sweden has been Britain's principal Continental market for electrical equipment, taking supplies (excluding generating plant and motors) with a total value of nearly £2,000,000 compared with a mere £96,000 in half of 1938.

Historical Works Survey

IN the *Electrical Review* of 9th July we described how the supply is being met mainly by private generation at the ball- and roller-bearing factory at Chelmsford of the Hoffmann Manufacturing Co., Ltd. Emphasis was placed on the evolutionary growth and conversion of the plant over the past forty years or so to the modern diesel-engine installation of to-day when, as the result of a wartime bulk public supply, the installation is operating in parallel with the public supply and the trend is towards expansion of the a.c. private generation. Now we propose to deal with the works distribution system and again to underline evolutionary growth and conversion as the essential background to the present-day system when the a.c. scheme is being expanded in line with the development of the generation system and with the modern technique of production.

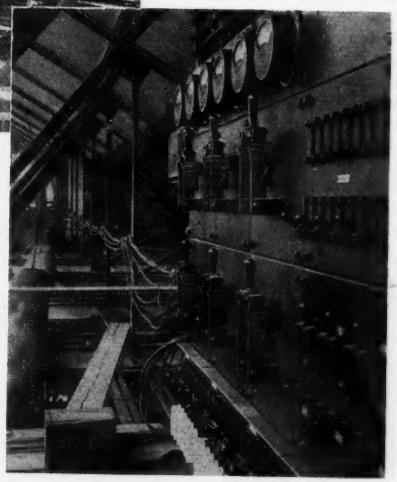


The main d.c. copper-rod feeders terminate at twelve main sub-switchboards in the roof

Evolutionary Growth of Distribution

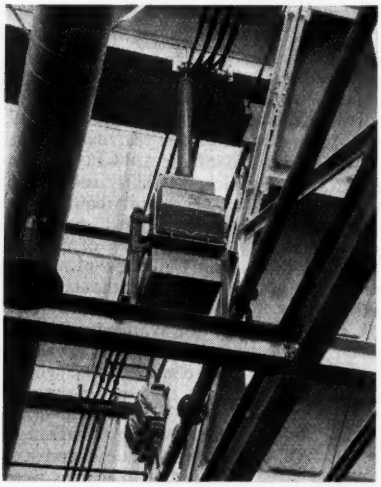
The first use of electricity in the factory was exclusively for lighting, and the demand for this was met by a public supply at 100 V, 100 cycles, the wiring being a wood-casing job. With the introduction of electric power driving, however, came the first comprehensive factory distribution scheme which was established with a 110-V d.c. supply from the private generation plant from which v.i.r. feeders cleated to the building structure were run out to the production plant. At about 1912 main feeders of bare-copper rod were established, and this system is still in vogue for the d.c. distribution for both the initial scheme at 110 V and for 220 V which was introduced a few years later.

Towards the end of the 1914-18 war the load growth was such that fairly substantial sub-distribution boards were required to feed the heavy motors driving the line shafting of that period. The majority of motors throughout the factory were then of 40 h.p. and 95 h.p., in accordance with the standardization group-driving scheme, and they employed Watford automatic starters. This practice was continued throughout until 1945 when the a.c. public supply and, later, a.c. private generation were introduced and a.c. motorized machines were installed in the newer sections of the factory. The incoming 11-kV supply was stepped down to 3·3 kV and 400 V for works major distribution which was effected by 0·3-sq. in., 4-core l.c. cables as overhead runs in the



north-lights of the building to the respective distribution points.

This system was so arranged as to provide

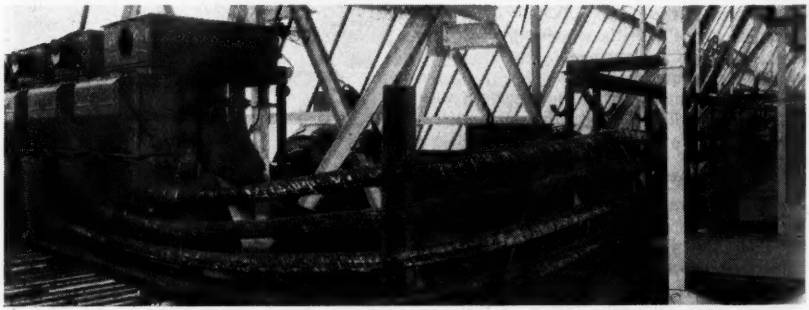


The a.c. system has had to be installed piecemeal and temporary cables were run out above girder level

easy connection later on to the factory generation system. From the circuit breakers in the new power house in factory "C" 0·3-sq in., 4-core cables in paralleled pairs were installed with suitable distribution gear and tap-off points throughout the works, and the cables were supported in racks or trays. These cables were run out to unit-type stanchion distribution boards which are now transferable from stanchion to stanchion as required by the layout of the production plant, and this flexibility is an outstanding feature of the system to meet the ever-changing requirements of modern production. Distribution from the stanchion units to the production machines is provided by v.i.r. wire-armoured cables run in steel conduits. The general lighting throughout the factory is at 220 V, d.c., and local lighting on the machines is at 110 V, d.c. in the older sections of the works and 25 V, a.c. in that part of the factory which is now serviced from the a.c. supplies.

We will now outline in more detail the d.c. and a.c. distribution schemes as they are now established, but it should be borne in mind that the evolutionary feature we have stressed in both this and the article describing the works generation is still, and will remain, the keynote to the whole scheme, and that the distribution is under constant revision, with the trend towards the introduction of a.c. when opportunities occur; indeed the evolutionary outlook may be described as a high-level policy of the company, in contrast to that of using a system "all out" with the minimum of maintenance until the position is reached when it is uneconomic or below the prescribed line of efficiency, and then completely renewing it.

To refer first to the 220-V and 110-V d.c. distribution, there are in the three engine rooms "A," "B" and "C" three main black-enamelled slate open-type switchboards. Mounted at 8 ft behind these boards are open-type spaced tinned-copper strip bus-bars of from 1 to 3 sq in. section, and from these bars both supplies are taken through suitably sized tinned-copper strip "drops" to 500-, 1,000-, 1,500- or 2,000-A open-type free-handle air-break circuit breakers with adjustable overload and time lag trips and

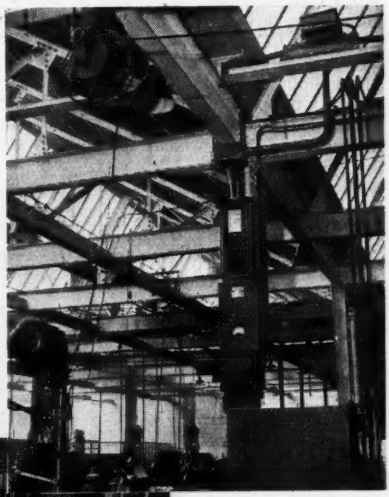


P.i., s.w.a., jute-served cables had begun to spread out over the grinding shop

carbon-arc or magnetic-blow-out features, according to the circuit requirements. From these breakers the circuits run through ammeter shunts and away via $\frac{7}{8}$-in., 1-in., or $1\frac{1}{8}$-in. solid-copper rods mounted in rack insulators protected by asbestos or sheet-iron covering, forming cable ways; or via 0·3-sq in. or 0·75-sq in. double-braided and compounded cables supported at close spacings by porcelain-insulated tallow-soaked leather suspenders on large galvanized strain wires at maximum spans of 75 ft. The long straight copper-rod runs are equipped with expansion joints, similar to those of steam pipes, to prevent buckling under expansion conditions.

These rods and cables terminate at twelve main sub-switchboards, mounted in the roof in various parts of the factory, each of which consists of from 4 to 12 mica-insulated slate-panel structures, fitted with either circuit breakers, d.p. knife switches or porcelain-handle withdrawable fuses, feeding the standard 5-way (200-A or 300-A) slate-panel power branch switchboards, which are also mounted above girder level, and the many 220-V general lighting and 110-V local lighting distribution boards required for service in a factory of this size under night-shift conditions.

There are numerous sub-circuits fed from the main circuits, such as those required for such purposes as emergency lighting, magnetic checks, impulse clocks, cranes with lifting magnets, lifts and hoists, blower fans, water pumps and controls, electric tempering ovens, automatic pyrometer furnace controls, fire and other signal systems, all of which require uninterrupted supplies.



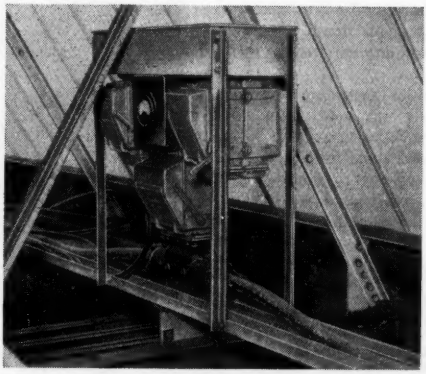
From the switch-fuses in the roof dormers cables were run to stanchion-mounted fuseboards

From the power branch boards to the line-shaft driving motors are run either 0·12- or 0·3-sq in. v.i.r. single-core cables in twin or multiple insulator racks, but for all other equipment gas-thread screwed conduit with welded adaptable junction boxes or normal conduit fittings is used.

The standard lighting distribution boards are of the ironclad 500-V rewirable porcelain-bridge type, and they are fitted as far as possible on standard brackets which are specially designed to fit the main stanchions which they grip, without the necessity of drilling, or they are fixed to the walls by similar brackets without the stanchion clamps.

Individual circuit switches are installed immediately below these distribution boards for the block control of lighting, which in some cases is served by local switches for

economic reasons. Practically all the 110-V local lighting is equipped with push-bar switch lampholders for the same reasons. Both counter-weighted pendant fittings and adjustable arm lamp brackets are used, according to the special requirements of the area served. The main office block is wired throughout with v.i.r. 4-core cable. This is run in a network of 1¼-in. conduit which was embedded in the floors during the building construction and which serves a system of floor outlets spaced 7 ft by 7 ft square. These conduit circuits are served by mains in a central duct running the full length of each of the four floors to floor inserted distribution boards, and they are continued down the built-in riser way at one end of the block to the main distributor panel at ground level which is fed by 0·3-sq in. v.i.r. cable from the main switchboard in engine room "A."



At strategic points specially designed distribution units have been erected; note use of inverted channels

The 400-V a.c. distribution system was started in 1945, and it has had to be installed piecemeal and superimposed on the d.c. areas to ensure that the a.c. supply would be available as and when the new a.c. individually driven and incorporated production machines arrived and were installed in the factory.

To do this without interrupting production, in the first instance two temporary 0·3-sq in., 3½-wire aerial v.i.r. cables were erected in two long spans from end to end of factory "C," supported at every 30 ft on reel insulators and fed via two 300-A h.r.c. switch-fuses mounted above girder level and, further, two 0·3-sq in., 3½-core p.i. l.c. s.w.a. cables were run over the roof trusses back to engine room "C" where a small emergency substation was erected. A temporary 0·3-sq in., 3-core p.i. l.c. s.w.a. jute-served and compounded cable was also run out through an underground tunnel to factory "B," and this was then extended overhead to factory "A."

This system provided an urgently needed skeleton supply covering the whole factory, and it was energized from the existing 3·3-kV, 1,000-kVA transformer—installed for the a.c./d.c. motor-generator set—fed from the public supply via a 500-kVA, 3·3-kV/400-V transformer and four 300-A oil circuit breakers erected in a small substation off the motor-generator room at station "C." Line taps were made on the 0·3-sq in. v.i.r. cables in the factory "C" roof to h.r.c. switch-fuses mounted in the roof dormers within 1 or 2 ft of the actual cable run, and from these switch-fuses cables were run either to stanchion-mounted ironclad fuseboards, each having its own isolator, or directly to the isolators on the larger machines. The machine cabling was carried out in 3-core v.i.r., s.w.a. and compounded cables of various sizes with suitable cable clamping glands. The cable to factory "B" terminated in a 300-A h.r.c. switch-fuse feeding a busbar chamber suitably located in an area adjacent to the tunnel, and tappings were made to feed the permanent 0·3-sq in., 3½-core p.i. l.c. s.w.a. jute-served distribution cables which had by then began to spread out to cover the large grinding shop in factory "B." From this same busbar chamber, via two other h.r.c. switch-fuses, the temporary supplies for factory "A" and the hardening shop were made available.

Oil circuit breakers of 600-A capacity on factory "C" main switchboard now control each pair of 0·3-sq in., 3½-core cables out to the shops. About two-thirds of the permanent l.v., a.c. distribution cables have now been erected, and are run above girder level in inverted 4-in. by 2-in. channels which became available in large quantities as the overhead line shafting and counter-shaft drives of the old belt-driven machines became redundant. Each cable is controlled by a 300-A h.r.c. switch-fuse at the point where it leaves the main cable way, and four-way switch units are mounted adjacent to the run.

At strategic points specially designed distribution units have been erected, spanning the channel cable runs, and the main cable is tapped by means of a split cable box to which is attached a 150-A h.r.c. switch-fuse. These tapping points are either fitted or allowed for at 30-ft spacings on cables running north to south, and at 40-ft spacings on cables running east to west. At each point there is provision for the standard distribution unit to be fitted above the switch-fuse if required, or, alternatively, a direct tap-off junction box containing four short busbars for connection to the larger sizes of the stanchion units direct, or again, to the very large machines direct, thus giving the system the greatest possible flexibility to enable it to cope with production plant removals and re-arrangements. The method of connecting the machine motors to the distribution stanchion units is by either 3-core v.i.r., s.w.a. compounded cables or normal conduit runs, according to the requirements dictated by the type of machine installed and its degree of permanency on the site.

Each machine has a plant number by which it is identified, and this number is exhibited on the outside face of the stanchion distribution unit in such a manner that instant reference can be made to the source of supply for that particular machine. Should any serious untoward occurrence take place in that area the isolator for that batch of machines, which is limited to a maximum of eight, can be immediately operated by the person nearest to it, thus isolating only a portion of supply instead of the whole of the main cable which may be feeding a large number of machines, the unnecessary stopping of which would adversely affect production.

We are indebted to the Hoffmann Manufacturing Co., Ltd. for permission to visit the works and publish this article.

Accidents in the Home

CAUSES OF ELECTRICAL MISHAPS

THE following notes are based upon particulars of electrical accidents on domestic premises between May and December, 1947, inclusive, which have been compiled by Mr. H. W. Swann, who acts as electrical adviser to the Home Office.

Of a total of thirty-one fatalities nine occurred in bathrooms; electric fires were involved in six of these. Two portable fires and one table cooker used for warming the room dropped into the bath from higher positions. Handling unearthed fires, faulty flexible cables, metal lamp standards and switches while standing in the bath caused the remaining deaths; in one instance a three-core cable was connected to a two-pin plug, the earth wire being left free.

Three accidents elsewhere were due to electric fires or their connections. In one a cold element was touched with one hand and the metal casing with the other; the fire was, however, not switched off but the plug fitted loosely in the socket, making intermittent contact with it. Five fatalities with irons were associated with the installation of the switch in the neutral wire. Amateur workmanship and ineffective bonding and earthing were responsible for most of the accidents attributed to faulty wiring and miscellaneous causes.

Inspection of the 27-year-old installation in a house, the scene of a fatal accident, revealed that it was protected by an open-channel fuseboard without main fuse-switch and that all switches were in the neutral conductor. Most of the switches were metal covered, many were loose from the wall, and behind some were taped joints. The lead sheaths of cables were discontinuous, loose from the wall and in contact with gas pipes. A two-pin unearthed socket in the kitchen was within easy reach of the conducting floor, and a 1-kW unearthed radiator was connected to a lampholder. The radio receiver was also connected to a lampholder, without insulated skirt but within easy reach of the floor, by a flexible cord in which were many unsatisfactory joints.

Plastics Year Book

A USEFUL trade reference book dealing exclusively with matters relating to the plastics industry is provided by the 479-page 18th edition of the British Plastics Year Book which is now available from Iliffe & Sons, Ltd., Dorset House, Stamford Street, London, S.E.1, price 30s. net. The arrangement of sections adopted in previous years has been retained, some of them having been considerably expanded, in particular the proprietary names section and the manufacturers' names and addresses. The glossary of technical terms has been revised, together with the group detailing available services, which appears at the end of the plant and equipment section. In the review of recent patents over 450 are summarized, thereby presenting the more important ones in a compact form. The literature regarding patents also gives a comprehensive view of the development in particular fields likely to be seen in the not too distant future.

Views on the News

By REFLECTOR

IT is not likely that one would connect the manufacture of telecommunication equipment with the production of tobacco pipes. I find that such a connection does exist, however, and the General Electric Co., Ltd., claims to be one of the largest producers of pipe stems in the country. In 1910, when difficulty was experienced in obtaining an adequate supply of high quality ebonite for telephone components, the company decided to produce its own and installed the necessary plant at Salford from whence it was later transferred to Coventry. The introduction of other moulding materials to the electrical industry, coupled with the increasing popularity of keyless automatic telephone equipment, soon led to a considerable reduction in the demand for ebonite. So in order to keep the plant working at an economic rate, the manufacture of pipe stems was commenced in 1933.

* * *

Since then, production methods and equipment have gradually been improved so that now from 7,000 to 8,000 lb of pure ebonite and 100,000 pipe stems are produced each week. All the moulds for pipe stems were made at Coventry, of which over 160 patterns are available. Among the pipe manufacturers supplied with stems by the company are some of the best known. Few stems are exported, but as the London-made briar is world famous, many of the finished products eventually find their way overseas.

* * *

As, like so many husbands, I participate in the annual fruit-bottling orgy, I take more than a passing interest in the various recipes given by the Electrical Association for Women and other organizations. With the housewife's electricity bill (not to mention the Ministry of Fuel and Power's economy campaign) in mind I question whether the long sterilizing times given—1½-2 hours are quite common—are really necessary. In my home, doing a few jars at a time with "Snap Vacuum Closures," we normally use the hot-plate, setting the "Simmerstat" to 4 till the water in the saucepan boils and then turning it down to about 2 to simmer for approximately 7 minutes. The whole operation takes only about half an hour and over a period of several years we have rarely had a failure. It has been suggested to me that probably the fact that we generally use fruit straight from the garden may have helped, but we have also bottled "shop" fruit similarly with equal success.

* * *

Many towns, I see, are going ahead with plans for the improvement of street lighting now that they are permitted to increase it to 75 per cent of the pre-war standard. From a fuel-saving point of view considerable economy has been achieved by conversions from gas to electricity, and at Portland recently it was pointed out that as a result it would be possible to restore 100 per cent lighting and yet keep within 75 per cent of the 1938-39 fuel consumption. The Council is pressing the Ministry for an early decision on changing over the remaining lighting to electricity. It is of interest to recall that in a report presented at Manchester a couple of years ago it was estimated that 30,000 tons of coal could be saved by converting the gas lighting to electricity.

* * *

Two pages of the report of the Electricity Supply Board of Eire are of special interest to gourmets. They deal with the year's activities of the Shannon Fisheries and record a very heavy migration of smolts and the most favourable spawning for many years. The weight of salmon taken at the Thomond and stake weirs was 48,589 lb compared with 27,980 lb in the preceding year. A new venture is the experimental breeding of oysters and about 130,000 young oysters were transferred to special trestles erected in the Shannon at Ballylongford Bay.

* * *

British electrical sales conferences seem tame affairs when contrasted with such gatherings in the United States. The *Edison Electric Institute Bulletin* reports that at a recent E.E.I. sales conference

"In a rousing finish to the first general session, Elmer Wheeler, noted speaker at business meetings and inventor of the 'tested selling sentence,' reminded the audience that 'It's the sizzle that sells the steak—not the cow. Hidden in every piece of merchandise, in every service that you can render someone, is a sizzle. It's the tang in the cheese, the crunch in the cracker, the whiff of the coffee. Find your sizzles—and you're on the road to success.'"

Simple Network Solution

Splitting into Three Circuits

By C. J. MITCHELL, A.M.I.E.E.

MANY readers will remember the old problem of finding the resistance between two opposite corners, as A and B in Fig. 1, of a network of 1-ohm resistors constituting the twelve edges of a cube. The usual method of solving such a network is to consider a hypothetical potential difference of, say, 1 V to exist between the two points, calculate the current in each branch and then deduce the effective resistance. By this

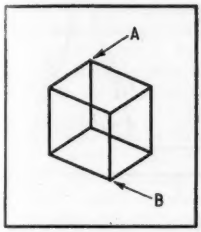


Fig. 1

method six equations containing six unknown quantities will be derived and by solving the equations the total current and consequently the resistance will be found.

The solution is quite straightforward but it is, however, extremely long and tedious. If the resistors are not all of the same value, then the calculation will become almost formidable and a good deal of work can be avoided by the employment of another method.

The circuit is re-drawn in Fig. 2; the only difference between this diagram and Fig. 1 is that the three rear resistors instead of meeting at a common point, are bent outward and connected to an outer ring of zero resistance. This does not simplify the calculation, but makes the network clearer, for current can be considered to be entering through each of the three outer resistors and leaving the network at the centre point. If the network is now split into three circuits as in Fig. 3, where each of the three central resistors has been split into two, the resistance of each section can be calculated by Ohm's law without applying Kirchhoff's laws. By splitting each resistor longitudinally, the cross section of each would be halved; the resistance would be doubled, so new values are given to these branches in Fig. 3. The solution of the upper section now becomes quite simple; this section consists of a 1-ohm resistor in series with a parallel circuit consisting of what is equivalent to two 3-ohm resistors in parallel, as drawn in Fig. 4. The overall resistance is clearly equal to 2·5 ohms, and as the entire network consists of three such sections in parallel, the resistance between opposite corners is $1/3 \times 5/2 = 5/6$ ohm.

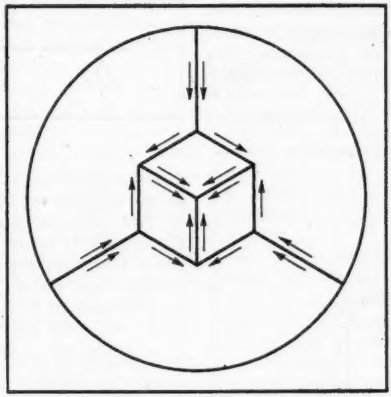


Fig. 2

Now let us consider a similar network in which the resistors are not all of the same value. In order to make the problem as difficult as possible we will give each resistor a different value, ranging from 1 ohm to 12 ohms; the network is shown in Fig. 5, together with the value of each resistance.

Section A can be resolved into a circuit consisting of a 1-ohm

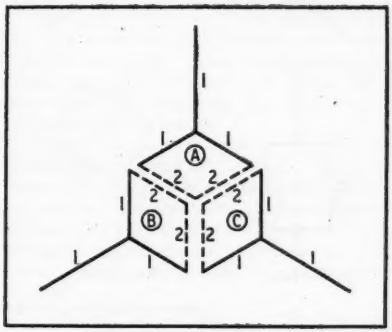


Fig. 3

resistor in series with an equivalent parallel circuit of 10 ohms shunted by 13 ohms. The equivalent circuit of each of the three sections is shown in the diagram together with the calculated values of resistance and the resultant resistance is seen to be 4·11 ohms.

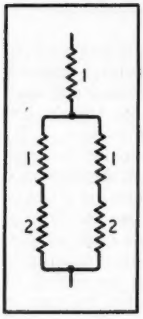


Fig. 4

The artifice of splitting a current-carrying branch of a network has many limitations, but on the other hand, it can often save a good deal of time; it can often be considerably more instructive than a full academic calculation. One good example is the proof of the value and phase of the line current in a polyphase delta-connected system, for a mathematical proof shows the magnitude and phase of the line current, but it seldom conveys much to a student unless he is capable of thinking mathematically. The method employed for the solution of the cube network is applied to the three-phase line-current problem. A delta-connected three-phase system is shown in Fig. 6; in the second diagram the upper conductor is shown as two separate conductors (1) and (2). Conductor (1) carries the outgoing current in phase 1 and conductor (2) carries the *return* current from phase 2. Assuming unity p.f. and a balanced load, the current will be in phase with the voltage in each case; thus,

$I_1 = I\underline{/120°}$ or $-0{\cdot}5\,I + j0{\cdot}866\,I$..... (1)

$-I_2 = -I\underline{/240°}$ or $+0{\cdot}5\,I + j0{\cdot}866\,I$.. (2)

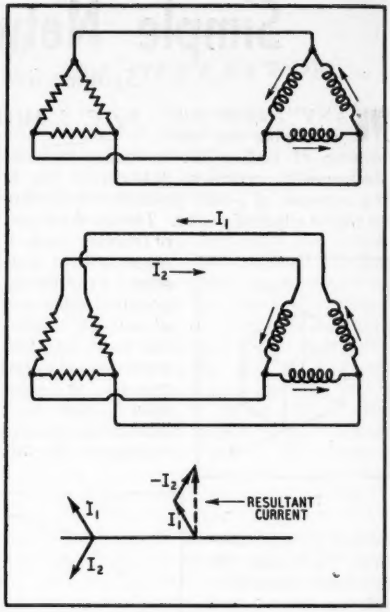


Fig. 6

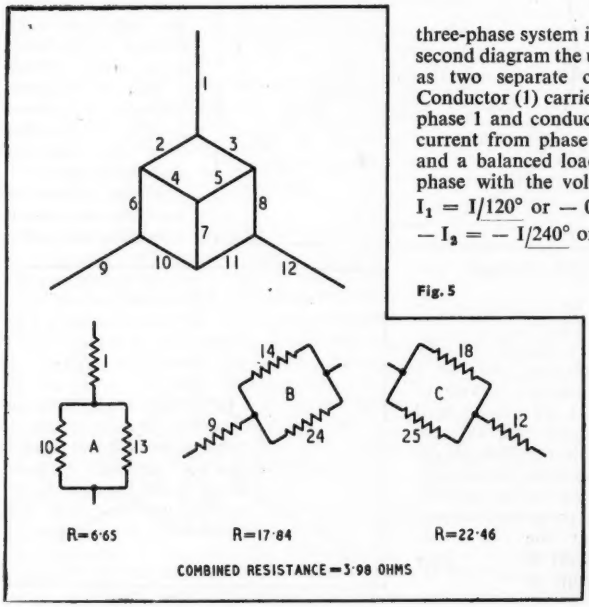


Fig. 5

A single conductor carries both currents, so the total is the sum of the two currents = $I_1 - I_2 = j\sqrt{3}\,I$ or $\sqrt{3}\,I\underline{/90°}$.

The current is shown vectorially in Fig. 6, where it is seen that it is a vertical vector; its phase is the same as that of the current in a star-connected system supplying a balanced load at unity power factor.

Correspondence

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents.

Electrical Fair Trading Policy

THE other day I came across some very early minutes, dated 8th January, 1934, of the Electrical Fair Trading Council, of which I have been a member since its inception. At that time those who had pledged their support of the Electrical Fair Trading Policy comprised 214 manufacturers, 132 wholesalers and 1,608 contractors/retailers. Since then much progress has been made and it would be no exaggeration to say that support of the Policy, which has always been on a voluntary basis, has so grown that few, if any, reputable organizations in the above three categories throughout the United Kingdom are not observing the principles enunciated therein.

As a direct result of the Council's work, the electrical industry, in so far as it is related to electrical consumer products, has developed on a sound and orderly basis and complete order has arisen out of the chaotic conditions which existed prior to the Policy. It is therefore bewildering to note that in certain circles to-day propaganda is being disseminated which appears to cut across and even discredit the established and proven tenets of the Fair Trading Policy; in fact, if the recommendations contained in the Simon Report on "The Distribution of Building Materials and Components" are typical of what representatives of the Government think is good for the public, then it would appear that there is no need for (*a*) an equitable trading structure; and (*b*) resale price maintenance.

I have seen what happens to industry both with and without the conditions outlined above, and if practical experience as an electrical contractor over many years is any guide in the matter, I am convinced that from all manufacturers and distributors there would be unanimous assent that what at present obtains under the policy is vital to the good of the industry, enhances the national economy and is of immense benefit to the general public.

Incidentally, in referring again to the Simon Report, I note from the section devoted to the United States survey, the impression is conveyed that the principle of resale price maintenance is only allowed to be operated on a limited scale specified by the Miller-Tydings Act. It would be more correct to say that prior to the Miller-Tydings Act resale price maintenance could only be carried out on a State by State basis. The Miller-Tydings Act permits resale price maintenance in inter-State commerce and to-day the American Fair Trade Council, which exists to protect the principle of resale price maintenance in both State and inter-State commerce, has a national membership comprising various industries.

Still to emerge is the Jacob Committee's Report on resale price maintenance, and if this is developed on the assumption that list price maintenance must necessarily operate against the general public, in a similar manner to what I feel has happened in the Simon Report, then little purpose will have been served.

W. H. WALTON,
Director,
Pinching & Walton, Ltd.

London, E.C. 4.

Earth-Leakage Protection

REGARDING Mr. Fawssett's letter in your issue of 23rd July, before any serious discussion of the problem takes place I feel that we should get the fundamental circuit data quite straight and beyond doubt. In his first paragraph Mr. Fawssett visualizes the earth-leakage *current* not rising to a value sufficient to trip a voltage-operated circuit breaker.

In all my investigations into the problem it has been found that when an earth fault first occurs, that is, as soon as the phase conductor comes into contact with an earthed casing, and irrespective of the value of the fault resistance or the earth circuit characteristics generally, the voltage impressed upon the metal casing is *full mains voltage*.

It is only as soon as a fault current begins to flow to earth that the impressed voltage falls to some lower value, finally settling at a steady value dependent upon the circuit characteristics—assuming that the fault is not immediately isolated.

If this view is correct, it follows that conditions can never arise in which the necessary voltage is not immediately available to trip the voltage-operated circuit breaker. When such a device has *not* functioned, it has invariably been found to be due to other causes and not to lack of the necessary voltage.

It is true that in cases of very high fault

resistance sufficient *current* may not be available to trip the voltage-operated device, but in any such case the fault must be considered as incipient and not falling within the category of faults representing danger from fire or shock. Also, we are looking at the device as a current-operated trip in this case, and even this failure to operate can be overcome with very fine coil windings. Practical conditions dictate robust coil windings, however, with a reasonable compromise between current and voltage.

I am of the opinion that Mr. Fawssett's suggestion of an upper limit as high as 3A will not remove danger but enhance the risk. It is reasonable to assume that a voltage-operated trip in the same circuit as the current-operated device he visualizes will operate long before the latter, especially in the presence of fault and earth electrode resistances of normal values.

Folkestone. T. C. GILBERT.

Technical Qualifications

"ELECTRICAL ENGINEER" has misunderstood me; maybe it was my fault. I do not doubt the value I get for my subscriptions to the learned societies; in fact in view of their enhanced prestige during and since the war I am more convinced of their value as an investment now than I was years ago when, despite the more discouraging remarks from my commercial friends, I sacrificed time and money to obtain qualifications which would enable me, after obtaining the necessary practical experience, to ask leave of my peers in the industry to be admitted to corporate membership.

One appreciates that on vesting day many persons who were not corporate members had to be given posts of responsibility because of the positions they then held, but is there any reason why this should continue?

If it is argued that there is a shortage of trained men, then if the untrained man enjoys the same salary as the former, one is entitled to ask who gets the benefit of the expense that the corporate member is put to not only for his subscription, mark you, but also for the time, trouble and further expense incurred if he is an active member?

The answer is, I think, the employers, and they should either pay the subscription or a bonus to holders of suitable qualifications.

Perhaps I see more in "Electrical Engineer's" words than he intends to convey, but if he implies that at a later stage we shall be recognized and the non-corporate man will have to prove himself by climbing over an efficiency bar, then I at least have been made wiser and thank him for it.

CHARTERED ELECTRICAL ENGINEER.

Noise from Switch-Plug

I WONDER if any of your readers have experienced a phenomenon similar to this. A 15-A switch-plug connected to the power supply makes a slight sound like that of cocking an air gun when a flash of lightning is experienced and becomes louder and rather alarming at times as the storm approaches.

The house is fitted with six power plugs of the same make but only one of these produces the noise referred to. No apparatus is connected to the power point mentioned above.

Dorchester. STANLEY ROGERS.

Light and Vision

SOME factors concerned in vision, light and seeing were the subject of a lecture in London recently by Dr. Matthew Luckiesh, director of the lighting research laboratory of the General Electric Co. of America at Cleveland. Mr. A. E. Turville, chairman of the Association of Optical Practitioners, introduced the lecturer, who was on his way back to the United States after attending the I.C.I. Convention in Paris.

Dr. Luckiesh spoke for 3½ hours without notes and illustrated his theme with more than eighty lantern slides. He devoted part of his lecture to eye testing and commented on the amount of defective vision in America, where 31 out of every 100 young people needed to wear glasses by the time they reached college.

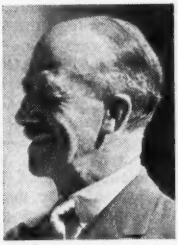
Anodizing Aluminium

A GREAT deal of practical information about the anodic oxidation of aluminium and its alloys is contained in Bulletin No. 14 issued by the Aluminium Development Association, 33, Grosvenor Street, London, W.1. Preparation and processing by the three main methods are described and information given about the plant required, operating conditions, appearance of the finished film, dyeing procedure and substances available for colouring, including special multicolour effects, direct printing and photographic processes. There is also a section on electrolytic brightening with appendices on bath control and methods of conducting tests, concluding with a selected bibliography and list of relevant British patents.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Minister of Fuel and Power has appointed **Mr. C. G. Morley New,** M.I.E.E., to be a member of the South Eastern Electricity Board. Mr. Morley New was appointed one of the Electricity Commissioners in 1935 after being for fifteen years city electrical engineer and manager of Cardiff. Before being appointed a Commissioner Mr. Morley New was a member of the South Wales and South-West England Consultative Committee and deputy chairman of the National Committee of the Central Electricity Board. He was president of the Incorporated Municipal Electrical Association in 1931 and was also a member of the Council of the British Electrical Development Association and the British Electrical and Allied Industries Research Association. In 1946 he was a member of the Government goodwill trade mission to Egypt.

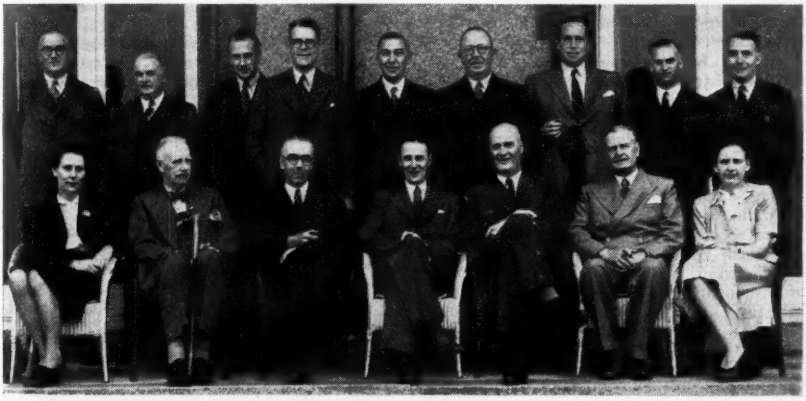


Mr. C. G. Morley New

In order to familiarize itself with the problems of each sub-area and to meet representatives of local government and industry, the **South Western Electricity Board** has now held a board meeting in each of the sub-areas. The July meeting was held in the Cornwall sub-area at Newquay and followed a lunch given for leading representatives of local interests. Sir Henry Self spoke at the luncheon and afterwards attended the meeting at the invitation of the Board.

Mr. W. Fletcher Cooper, M.I.E.E., has been appointed district manager, Gloucester District, in the Central Gloucestershire sub-area of the Midlands Electricity Board. He was formerly deputy chief engineer and general manager of the Gloucester Corporation Electricity Department. **Mr. K. W. Finch,** B.SC., A.M.I.E.E., A.C.I.S. who has been appointed district manager, Cheltenham District, was previously deputy borough electrical engineer at Cheltenham and for a time acting engineer and manager.

Mr. T. S. Pick, B.SC., M.I.E.E., substation engineer with London Transport, has been appointed electrical engineer, and will be responsible to the chief engineer for the whole of the electrical generation and distribution systems of the Executive. Mr. Pick, who is fifty-two, was educated at St. Peter's School, York, the Royal Military Academy, and University College, London. After two years as a student-apprentice with the British Thomson-Houston Co., Ltd., he entered the service of the London Electric Railway Company in January, 1923. During the whole of his



South Western Electricity Board meeting

Front Row : Mrs. M. N. Salmond (assistant secretary, administration), Messrs. G. H. Johnstone (part-time member), H. Midgley (deputy chairman), S. F. Steward (chairman), Sir Henry Self (deputy chairman, B.E.A.), Mr. Frank Forrest (part-time member), Miss E. M. Watson (personal assistant to Sir Henry Self). *Back Row :* Messrs. H. W. Millatt (No. 4 district manager, Cornwall), A. C. Owen (sub-area manager, Cornwall), D. S. Bentham (solicitor and deputy secretary), H. D. B. Wood (secretary), Sir J. Kingcome (part-time member), Councillor S. H. Payne, J.P. (part-time member), Messrs. A. N. Irens (part-time member), C. E. Knight (chief accountant) and R. W. Steel (chief commercial officer)

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service Mr. Pick has been associated with the Electrical Department of the " Underground " group and of London Transport. His early experience was gained in the preparation and execution of power station reconstruction programmes. From 1932 onwards he was engaged generally upon electro-technical development work within the department and was appointed technical investigation officer (electrical) in 1939. He was appointed sub-station engineer in 1945.

On 23rd July a presentation of an inscribed silver tea service was made to **Mr. J. R. Taylor,** A.M.I.E.E., A.M.I.I.A., M.INST.F., by the staff and employees of the St. Helens power station and an electric coffee percolator and thermostatically controlled iron by the administrative and distribution staffs of the St. Helens undertaking. Mr. Taylor, who was formerly deputy borough electrical engineer and manager, is leaving St. Helens to take up an appointment as co-ordinating engineer, plant operation, on the headquarters staff of the British Electricity Authority in London. Before his appointment as deputy borough electrical engineer and manager Mr. Taylor was power station superintendent at St. Helens and had previously held appointments with the Kent Electric Power Co., The County of London Electric Supply Co., and the Hull Electricity Department.

Mr. J. R. Taylor

Mr. A. C. McEvoy is joining Sangamo Weston, Ltd., in charge of the advertising section of the Contracts Department in place of **Mr. A. S. Ailes,** who has now left the company.

Mr. Billy Boyce, who is on the staff of the British General Electric Co., Pty., Ltd., Sydney, is a member of the Australian Olympic team. He is amateur welter-weight champion of Australia for 1947-48.

The social functions of the **I.E.E. Mersey and North Wales Centre** have resulted in substantial contributions to the benevolent funds of the Institution. The annual dinner-dance held on 12th March at Reece's Ballroom, Liverpool, was attended by nearly 200 members and friends, and the annual golf competition was held at the Southport and Ainsdale Golf Club on 3rd June, 80 competitors participating. The G. P. Dennis Trophy was won by Mr. E. G. Taylor, 8 down. As a result of these functions the committee has been able to hand over the sum of £290, including £190 to the Homes Fund and £100 to the Benevolent Fund. In addition, as a result of a special appeal the sum of £413 12s. has been handed to the Homes Fund.

The sixth annual Ekco Sports Day was held on 24th July in excellent weather. Besides the numerous " house " events between the four divisions of the company—Radio, Plastics, Ekco-Ensign Electric and Offices—there were several Women's Essex County and N.C.U. County cycling championships which proved extremely popular. A children's corner provided " all the fun of the fair." At the end of the meeting prizes were presented by **Mrs. E. K. Cole,** the wife of the managing director.

There were many attractions at the annual sports of the **Midlands Electricity Boards (Gloucester District)** held on the Electricity Social and Sports Club's Cricket Ground at Castle Meads on 10th July. The proceedings were initiated by Mr. W. Fletcher Cooper (district manager), who welcomed the large attendance of staff and employees and their families, and the many visitors present. Mrs. W. Fletcher Cooper presented the prizes.

Obituary

Mr. C. W. Jacobs.—We regret to record the death in an air accident near Brussels recently of Mr. Charles William Jacobs, A.M.I.E.E., executive assistant to the works director of Standard Telephones & Cables, Ltd. Mr. Jacobs, who was born in 1896, was educated at Plumstead and the London School of Engineering and Navigation. He joined the Western Electric Co. as a student in 1911 and served with the Royal Engineers in France and Belgium during the 1914-18 war. In the years between the wars he was largely responsible for the planning and installation of the long-distance cable system of Europe. This work took him to France, Sweden and Italy where, after the installation of the Milan-Turin-Genoa cable, he stayed for over ten years. He returned to England and during the last war undertook a number of important duties with Standard Telephones & Cables, Ltd. In 1945 he went again to Italy and was a member of the Commission which drafted a nation-wide plan to reconstruct the war-damaged toll cable system, returning to London at the end of last year. A memorial service was held at St. Pancras Church, London, on 22nd July and was attended by a number of the directors of Standard Telephones & Cables, Ltd., and its associates, and by former colleagues.

Mr. H. G. Ward.—We regret to learn of the death, which occurred recently, of Mr. Horace G. Ward, director and secretary of Rowlands Electrical Accessories, Ltd., Birmingham. Mr. Ward had for a number of years been manager of the company's accounting department. He was appointed secretary of the company in 1938 and was elected to the board in 1941.

Mr. G. H. Congdon.—We regret to learn of the death on 1st August, at the age of eighty of Mr. George Henry Congdon, A.M.I.E.E., formerly managing director of Etchells, Congdon & Muir, Ltd.

Harbour Radar

LIVERPOOL SUPERVISION SCHEME

SHORE-BASED radar equipment, as distinct from ordinary ship-borne outfits, has been installed by the Mersey Docks and Harbour Board for the supervision of shipping when the port of Liverpool is fog-bound.

This installation, which was officially inaugurated last week, will not be used to control shipping. Navigation will remain the responsibility of ships' masters and pilots. The word "supervision" is employed in its literal sense of "looking over" the approaches to the harbour to furnish information about the positions of vessels rather than to exercise executive control over their movements.

The installation has been carried out by the Sperry Gyroscope Co., Ltd. (Brentford) and A. C. Cossor, Ltd., were the sub-contractors for the visual screen display equipment. The rotating scanner is mounted on top of an 80-ft ferro-concrete tower of "lighthouse" shape with the transmitting, receiving and power equipment housed in a hut at its base. The site is the north-west (seaward) corner of Gladstone Dock which affords the scanner an unrestricted view of the whole of Liverpool Bay and up river as far as the Prince's landing stage.

The scanner consists of a "cheese" 15 ft across and 2 ft deep, which sits on a casting carrying roller bearings on a steel track 5 ft in diameter. The scanner "mirror" is constructed of a series of horizontal slats instead of a solid sheet to reduce wind resistance. It is designed to function in winds of up to 100 miles per hour with negligible back-lash; heaters are fitted in the slats to prevent icing in cold weather, while the slats are supported in a series of rollers in the main frame so that they can expand and contract without distorting the "mirror" surface.

In the control room are the transmitter-receiver, master timer, pulse generator, scanner repeater, servo system, monitoring meters and oscilloscope for checking purposes, mounted on racks and trays that can be drawn out for maintenance. The apparatus cupboards and wave guide tube are air-blown to prevent condensation of moisture, the air coming through ducts under the floor from a blower in the base of the tower. The latter has an inside staircase up to a weatherproof room at the top containing the 6 h.p. motor and gear train which rotate the scanner at 10 r.p.m., the maximum range being 20 miles out to sea.

The received echoes are viewed in plan on the display console by means of six 10 in. squares on the screens of 15-in. diameter cathode-ray tubes, each mounted on rack framework that can be withdrawn backward for servicing. One display is a small-scale true plan view of the whole bay; the next four (four times greater scale) view slightly overlapping sectors of the approach channel and estuary while the sixth is a large-scale "wandering display" that can be switched to view 22 different parts of the bay.

The power room contains the main switchgear and two 5-kW motor-alternators running in parallel off the public mains. A stand-by 50-kW diesel-driven alternator is to be added later.

Electricity Commission Dissolved

THE Minister of Fuel and Power has made the Electricity Commissioners (Dissolution) Order, 1948 (S.I. No. 1769). The Order, which came into operation on 1st August, provides for the transfer of the property rights and obligations of the Commissioners and their remaining functions to the Minister.

The Commissioners were established in 1920 under the Electricity (Supply) Act, 1919, for "promoting, regulating and supervising the supply of electricity." Provision was made in the Act for the authorization of schemes for the establishment of Joint Electricity Authorities, but in the absence of compulsory powers the desired results were not achieved, and it was not until the establishment of the Central Electricity Board under the Electricity (Supply) Act, 1926, that more effective control of generation and main transmission on a national basis was secured.

The Act of 1919 transferred to the Commissioners loan sanctioning powers and gave them certain controlling powers in regard to the establishment of new or the extension of existing generating stations and the approval of bulk supply arrangements. Other powers were delegated to them, including the making of Regulations for securing the safety of the public and for ensuring a proper and sufficient supply of electrical energy and in regard to the erection of overhead lines. Under the Act of 1926 the Commissioners prepared schemes for submission to the Central Electricity Board and they were also given certain quasi-judicial functions.

As from vesting date only residual powers remained with the Commissioners, the principal being those under the Electricity Supply (Meters) Act, 1936. These are now being vested in the Minister.

The original chairman of the Commission was Sir John Snell who was appointed in 1920 and retired in 1938. Sir Cyril Hurcomb then became chairman and when he resigned in 1947 to take up the chairmanship of the British Transport Commission he was succeeded by Sir John Kennedy.

Data on Domestic Consumers

Extensive E.R.A. Survey

RESULTS of a "Large-Scale Sampling-Survey of Domestic Consumers" have been published by the British Electrical and Allied Industries Research Association. Technical Report K/T 125a (9s. net) gives statistical data of tariffs, meters, dwellings, consumption, appliances and installed load for an aggregate sample size of 52,500 (based on a standard of 500), corresponding to three million domestic consumers of about 60 undertakings in 1945-46.

A table of consolidated total values shows that 60 per cent of the consumers were supplied on a two-part tariff and 21·3 per cent on a lighting-only flat rate. Credit meters were installed in 71 and straight prepayment in 19·4 out of every 100 premises. Terraced houses were in the majority with 41·3 per cent followed by semi-detached houses with 31·7 per cent. Rateable value averaged £18 for a floor area of 960 sq ft and 4·8 rooms. Average size of household was 3·5, about half being occupied by semi- and fully-skilled workers. Annual consumption averaged 1,010 kWh compared with 950 for the whole country, indicating that the results were representative of conditions everywhere.

For electric cookers (averaging 5·5 kW), the saturation factor (i.e. percentage of consumers possessing the appliance) was 16·6, compared with gas at 74·6 (including 29·8 modern) and other fuels 24·5. Electric cookers having radiant boiling plates formed about 20·7 per cent of the total and those with solid plates with at least one ground-base utensil 46·8 per cent. Electric kettles were in use with 70 per cent of the cookers. Only 11·1 per cent of consumers had no alternative means of cooking.

Percentage saturation factors for other electrical appliances were: Kettles, 18·9; boiling plates, 3·5; toasters, 4·2; percolators, 0·6; warming plates, 0·3; wash-boilers, 5·2 (gas 31·9); washing machines, 2; irons, 81·9; refrigerators, 2·2 (gas 0·7); vacuum cleaners, 38·2; fans, 0·5; sewing machines, 2; hair-dryers, 1·8; soldering irons, 1·9; clocks, 10·8; mains radio, 88·5; battery radio, 3·6; relay radio, 1·9.

Water heaters of all types, excluding wash-boilers, had a saturation factor of 10·3; including wash-boilers, the figure reached 14·1. For immersion heaters (averaging 2·7 kW with a provisionally estimated capacity of 27·6 gal), the saturation factor was 7·5; 59·6 per cent were thermostatically controlled and 56·3 were unlagged. Sink heaters (0·8 kW and 1·7 gal) had a factor of 2·1 and large self-contained heaters (1·7 kW and 12·6 gal) 0·9. Saturation factors for coal, coke and gas were 49·2, 9·5 and 13·9. The proportion of houses with no water heating equipment was 20·6 per cent.

For space heating the saturation was 60·9, the average kW installed per heating consumer (one each) being 1·4 kW; gas had a saturation of 11·8. Each consumer possessed an average of 8·6 lamps and 14·8 per cent had no socket outlets. The average installed load was 4 kW. The fixed charge on two-part tariffs was £2·45 per consumer; the annual bill excluding and including hire-charges was £5·25 and £5·4, giving 1·25d. per kWh in the former case. The 18 pages of the document include 18 tables and 26 diagrams bearing on the range of the survey and the variations between undertakings and between individual consumers.

New Watt-Hour Meter

A NEW energy meter of somewhat unusual design is described by Mr. I. F. Kinnard, manager of the meter and instrument division of the General Electric Co., Mass., in the current issue of *Electrical Engineering*, the official journal of the American Institute of Electrical Engineers. The central feature of this instrument is that the suspension of the disk is effected by means of two cylindrical magnets of high-coercive material placed one within the other, the outer magnet being fixed to the meter frame and the inner one to the upper portion of the disk shaft. These magnets are magnetized axially with opposite polarities so that the resulting field supports the moving system at a definite and small downward displacement.

In order to maintain alignment, graphite guide bushings, which run on steel guide pins without lubrication, are fitted at both ends of the shaft. The only cause of mechanical friction and wear in the system is the presence of side thrust forces and the design has been made such that these are inherently low. Neglecting the effects of side thrust, the bearing stress, due to the weight of the disk, is eliminated, and the torque to weight ratio, which has long been accepted as being of the order of 3 or 4 to 1, has been increased to infinity.

A.S.E.E. Meetings

MEETINGS arranged for next week by various branches of the Association of Supervising Electrical Engineers are as follows:—Tuesday, 10th August, at Hammersmith Town Hall, 7.30 p.m. West London Branch. "The Maintenance of Factory Electrical Equipment," by Mr. A. Carpenter. Thursday, 12th August, at Lacey Hall, Hazelwood Lane, Palmers Green, 8 p.m. North-East London Branch. "Cable Fault Locating," by Mr. H. E. Tickner. Friday, 13th August, at Crewe Arms Hotel, Crewe, 7 p.m. Crewe Branch. Discussion on "Present-Day Technical Training of Electrical Apprentices," opened by Mr. M. MacMaster.

Industry and the House

Anglo-American Industrial Co-operation

By F. J. ERROLL
M.A., A.M.I.E.E., M.P.

THE present session came to a close on 30th July amid the sweltering heat of London. Members of all parties felt the strain, and question time during the concluding days was conducted in an acrid atmosphere. It was in this mood that the House received news of Sir Stafford Cripps' proposal to set up an Anglo-U.S. Council of businessmen to advise on British industrial productivity. Members on all sides of the House were disturbed at the proposal and did not hesitate to say so to the Chancellor. Matters were not improved by the vagueness of the Chancellor's statement on one essential point, namely whether the committee is to examine industrial productivity in this country generally, or whether it is to deal individually with separate specified industries. It is felt that close co-operation already exists between individual firms and industries of the two countries and that it is only the refusal of the Treasury to supply dollars for business visits and the difficulties of obtaining passages that prevents Anglo-American co-operation from being even more effective. The electrical manufacturing industry is a striking example of the close interchange of ideas and production methods which is constantly taking place between the two countries. The Americans, indeed, learn as much from us as we learn from them.

Obstacles to Higher Productivity

If, however, the joint council is to report on the general obstacles to higher productivity in England, then its work seems hardly necessary because these factors are already apparent. They are the five-day week, faulty allocations of raw materials, the operation of Government controls, the high price of coal, and the disincentive of high taxation, neither men nor managers being prepared to give their utmost effort when so much of the extra reward is taken from them by taxation. There is a rich field for inquiry to be found in the restrictive practices of the trade unions, but this is a matter which is already well known in England and a report of yet another committee is unlikely to make much difference.

Politicians are more and more looking to hydro-electric power to provide electricity both at home and overseas in view of the rising cost of coal and other alternative fuels. As Colonel Walter Elliot said in a debate on trade and industry in Scotland: "We are going to burn rain. We have plenty of rain in Scotland. To burn rain sounds a very good idea, but look at the figures . . . and I am not quite certain whether cheap power is going to be secured by the present run of hydro-electric developments." Colonel Walter Elliot is quite right to point out the high cost of the schemes promoted by the Scottish Hydro-Electric Board. He estimated the aggregate figure as being about £55 million, which he said was larger than the sum required to develop all the coalfields of Scotland. He was replying to suggestions made by several Socialist M.P.s that a new era of industrial development would spring up in the North of Scotland based upon cheap electrical power. Mr. Henderson Stewart, while welcoming the hydro-electric developments, queried whether they were fully justified. The Government reply was extremely cautious.

Colonial Development

The danger of over-optimism was also stressed by Mr. Lennox Boyd when he opened the debate on economic development in the Colonial Empire. He was referring to the hydro-electric project to be developed at the Owen Falls in Uganda and said that people were talking as though the scheme was already completed. In fact, the gigantic programme of industrial expansion is really an energetic attempt by the Uganda Electricity Board, the composition of which was announced in Parliament on 28th July, to find a minimum industrial load to justify the great expense of this engineering project. Mr. Lennox Boyd doubted the wisdom of such optimism at a time when in every corner of the Empire there is already a desperate shortage of capital equipment—equipment, too, which could be used for an immediate increase in Colonial productivity.

Parliament reassembles on 13th September for a short session to deal with the Parliament Bill and then, it is expected, will go into recess again from 24th September until the beginning of the new session on 26th October.

PARLIAMENTARY NEWS

By Our Special Reporter

IN the course of a reply to a question regarding the acquisition of road transport undertakings last week Mr. Barnes, the Minister of Transport, said that with regard to road passenger undertakings the British Transport Commission had arranged to acquire three undertakings vested in the British Electricity Authority. Negotiations were proceeding in certain other cases.

Area Board Officers' Salaries

Replying to Mr. Anthony Greenwood, the Minister of Fuel and Power said that the salaries paid to the chairman, deputy chairman and members of the Area Electricity Boards were the same for each Area except in the case of two individuals who were officers of undertakings transferred on vesting date and were in receipt of salaries higher than those fixed for the posts to which they were appointed.

Uganda Electricity Board

Mr. Erroll asked the Secretary of State for the Colonies what were the names of the members of the newly formed Uganda Electricity Board, their qualifications and their salaries. Mr. Rees-Williams said that the members were Mr. C. R. Westlake (chairman), the Financial Secretary or his representative, the Director of Public Works, Sir John Kennedy, Mr. H. R. Fraser, Mr. A. N. Maini and Mr. C. H. Bird. Both Mr. Westlake and Sir John Kennedy were engineers of wide experience. The three remaining named members were well-known local businessmen and members of the Legislative Council. They had served on many Advisory Boards and Committees in Uganda. Mr. Westlake's salary as chairman and chief executive officer was £2,500 per annum. Sir John Kennedy was not receiving any remuneration and the remaining three members of the Board were receiving an allowance at the rate of £200 per annum each. The Director of Public Works and the Financial Secretary as ex-officio members received no additional remuneration.

Mr. Erroll asked why, under the resolution of the Uganda Legislative Council setting up an Electricity Board, private individuals were prohibited from installing their own generating plant.

Mr. Rees-Williams said that private persons were not prohibited from installing their own generating plant provided they obtained a licence from the Board.

Lighting and Overseas Visitors

Brigadier Medlicott asked the Minister of Fuel and Power if, in view of the large number of overseas visitors who would be in London during the next few weeks, he would authorize a temporary restoration of pre-war lighting in the West End of London. Mr. Gaitskell replied that owing to the continuing need for economy in the consumption of all kinds of fuel, including electricity, he was afraid he could not agree to relax the existing restrictions on lighting for display purposes.

Deaf Aids

In reply to Lieutenant-Colonel Lipton, Mr. Bevan said that up to 26th July, 1,680 "Medresco" aids had been delivered from the manufacturers and 1,200 had been issued to hospitals in England and Wales.

Royal Assent

The Royal Assent has been given to the Gas Act and the Development of Inventions Act.

Parliament rose for the Summer Recess on 30th July, and will reassemble on Monday, 13th September.

Australian Notes

From Our Own Correspondent

SYDNEY'S power shortage may continue for at least another two years, according to Councillor J. O. Cramer. Total orders which have now been placed for generating plant amount to over £11,000,000.

The Victorian Minister for Mines and Electrical Undertakings (Mr. Lienhop) states that the £65,000,000 Power Development Bill provides the State with the greatest opportunity in its history for industrial expansion, and he considers that it will eventually rid the State of all its power problems.

Transport

Tenders for 250 new tramcars costing £8,175 each, have recently been accepted by the New South Wales Transport and Tramways Department.

New Motor Factory

A new factory for the manufacture of electric motors and accessories to be established at Willaston, South Australia, by the Century Electric Co., Sydney, will eventually provide employment for about 200 workers.

Training in England

As a memorial to the late Mr. Frank Parkinson, Crompton Parkinson (Australia), Ltd., is giving its young electrical engineers an opportunity to study overseas by means of a bursary scheme. Successful candidates will receive two years' practical training in the workshops and laboratories of the parent company in England.

Peak-Load Problems

THE CLOW COMMITTEE'S REPORT

THE Ministry of Fuel Committee which was appointed last February under the chairmanship of Sir Andrew Clow to investigate the practicability of reducing system peak demands in relation to non-industrial consumers has now issued its recommendations (Cmd. 7464, H.M. Stationery Office, price 6d. net). The way in which the several uses of electricity now contribute to the national peak is indicated in the accompanying diagram.

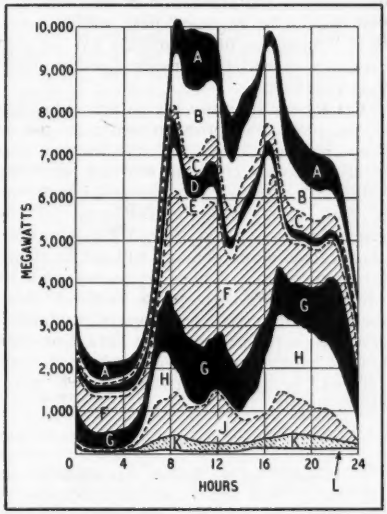
The Committee is concerned with long-term as well as short-term measures. Indeed, it is pointed out that the recommendations can do little to alleviate next winter's peak load problems, apart from making running charges of domestic tariffs higher from December to March than in other months and associating this measure with a vigorous publicity campaign as to the reasons for it. For commercial premises more extended use of the maximum-demand tariff would provide an incentive to spread demands.

Although no instruments for controlling domestic consumption at peak periods would justify installation on a short-term basis, experiments should be carried out to ascertain the effect of various devices on long-term economy. Where central control systems exist (as they do in 110 areas at present), their application to the control of water heaters of not less than 2 kW should be extended, if necessary with tariff inducements. This would lead to a load reduction of from 300 to 400 MW during the morning peak, but the effect would be much less significant during the late afternoon, especially if restrictions were removed from public lighting, window-display and sign lighting. The use of central-control equipment for other purposes would also materially affect the position.

Restricted Supplies

Off-peak tariffs could advantageously be offered to commercial and the larger domestic consumers who agreed to connect part of their installations (e.g., space heaters) to a circuit the supply from which would be liable to short interruptions. Blocks of flats or new housing estates in areas with central control should be so wired as to permit of inexpensive experiments of this kind.

Although the contribution of water heating to the peak is only about one-tenth of that made by space heating, its thermal-storage characteristic enables it to be interrupted with little inconvenience to consumers.



Components and demand in grid system on a typical winter day

SHOPS, OFFICES, etc.: A, space heating; B, lighting; C, power

FACTORIES: D, space heating; E, lighting; F, power and miscellaneous. DOMESTIC AND FARMS: G, space heating and miscellaneous apparatus; H, lighting; J, cookers, water-heaters, wash-boilers and radio. K, TRACTION. L, PUBLIC LIGHTING

Forms of space heating and other uses which embody thermal storage should be developed. For larger domestic consumers, the provision is recommended of a centrally controlled switch that would change the circuit over to a higher tariff during peak periods.

Load limiters have the disadvantages that a limit cannot be assigned to each consumer and that his requirements need in equity to be related to his other fuel services. His demand may be on a Sunday and two to four times as great as that made on the system peak on weekdays. The latter objection might be overcome by adding a time switch or central-control switch which would

operate only when the peak load had to be cut.

Attention is drawn to the value of consultation with representative bodies and the spreading of information about the need for, and the methods of, reducing loads at critical times. Since fear of solid-fuel shortage has been a potent factor, an assurance to non-industrial consumers that coal supplies will be maintained or improved would contribute materially to the alleviation of the difficulties that are to be expected next winter, when even a reduction of one million kW on cold mornings would not ensure freedom from load shedding.

The Report discusses the nature and extent of the peak load problem (with the aid of five diagrams), costs of instruments, and tariff proposals entailing and not entailing additional expense. The general conclusion is that, even with the fulfilment of the generating plant programme, the gap between plant capacity and demand will not be closed for two years. Unless measures can be adopted to restrict peak demand, load shedding with consequent loss of production is almost certain during that period or even longer, since no safety margin has been allowed in official estimates of plant requirements.

Minister's Statement

A statement on the Report was made by the Minister of Fuel and Power in the House of Commons on Friday. He said that the recommendation regarding spreading the peak demand of commercial consumers had already been acted upon and further discussions would take place locally. All but one of the remaining recommendations were concerned with the installation of various devices designed to regulate or measure maximum demand or the demand at the peak period. He had asked the British Electricity Authority and the Area Boards to try out these suggestions.

The remaining recommendation was that in the case of domestic two-part tariffs the charge for three months in the winter should be relatively higher. This proposal was of special importance at the moment because it was the only one which required no additional equipment and which could affect the domestic demand next winter. As the Committee pointed out, it was not a perfect answer to the peak load problem, but combined with a vigorous publicity campaign it should make a significant contribution to reducing the peak load. Accordingly he had asked the British Electricity Authority and the Area Boards to put it into effect. It was intended that the increased charges in the winter should be offset by reduced charges in the other months so that domestic consumers as a whole paid over the year neither more nor less than they would have paid with a uniform tariff throughout the year.

Pakistan Hydro-Electric Development

IN December last it was announced that the Pakistan Government had obtained the services of Sir Henry Howard to advise them on the planning of hydro-electric schemes. Sir Henry Howard was largely responsible for the development of the hydro-electric resources of Southern India and has been adviser on electricity to many Provincial Governments. The United Kingdom Trade Commissioner at Karachi states that Sir Henry's report was submitted some little time ago but so far has not been published. It is understood, however, that he has recommended the creation of a Statutory Power Board to deal with policy and to act as the co-ordinating authority for provincial boards to be set up covering Sind and Baluchistan, the Punjab and the N.W. Frontier Province, and Eastern Pakistan. He also recommended the setting up of a Central Engineering Authority to co-ordinate the development and utilization of the water and power resouces of the country, with civil engineering and electric power branches.

The remainder of Sir Henry's report was concerned with the schemes which he recommended should be put in hand immediately, including the Mianwali (West Punjab), Karnafuli (near Chittagong in East Bengal), Sind Canal and Dargar (N. W. Frontier Province) Schemes. Other recommendations were that orders be placed for turbo-generators with switchgear and transformers for thermal schemes at Karachi, Chittagong, Rawalpindi, Dacca, Lyallpur and Hyderabad (Sind).

The recommendations were discussed at a conference held in Karachi under the presidency of Mr. Chundrigar, Minister of Commerce, Industries and Works, who in his opening address recommended the creation of a Central Engineering Authority on the lines of Sir Henry Howard's proposal. No decision has yet been taken to create the Central Authority, and the Pakistan Government's decisions are to be announced, it is understood, after consulting the West Punjab and East Bengal Governments.

The second item on the agenda of the conference was the nationalization of electrical industries. Mr. Chundrigar stated that the Government agreed that public generating stations should be acquired by degrees, but felt that the time was not yet ripe for doing so. He suggested that the conference should consider whether private enterprise should not be assured that for a period of ten years the Government would not compulsorily acquire their businesses.

Commerce and Industry

Contracting-Industry Apprenticeships. Engineering Wages Inquiry.

THE Minister of Works has appointed an Apprenticeship and Training Council for the electrical contracting industry, under the chairmanship of Sir George Gater, who is also chairman of the Building Apprenticeship and Training Council. The Council will advise the Minister on all matters concerning apprentices in the industry. The members are Messrs. L. C. Penwill, R. A. Marryat, E. A. Reynolds and J. D. Green representing the National Federated Electrical Association, and Messrs. E. Foulkes, W. C. Stevens, R. G. McLennan, L. J. Gregory and G. Stevens, representing the Electrical Trades Union. The Ministry of Education, Ministry of Health, Ministry of Labour and Ministry of Works are also represented on the Council. Mr. J. C. Cox, Ministry of Works, will act as secretary.

Metallurgical Research

The Admiralty and Ministry of Supply have set up an Inter-Service Metallurgical Research Council to advise them on metallurgical problems of importance to the Services. The formation of this Council will provide for the interchange of ideas on metallurgical problems common to the different Services, and avoid overlap between their research programmes. It should also ensure that balance is maintained between fundamental and *ad hoc* research, and that the long-term research necessary for the provision of new alloys is embarked upon. The Research Council includes representatives of the Admiralty and Ministry of Supply, and the independent members are:—Professor L. Aitchison, chairman, Professor E. N. da C. Andrade, Professor G. Wesley Austin, Mr. G. L. Bailey (Director, British Non-Ferrous Metals Research Association), Dr. R. W. Bailey (Metropolitan-Vickers Electrical Co.), Mr. H. H. Burton (English Steel Corporation), Dr. W. Hume-Rothery, Dr. H. Moore, Mr. A. J. Murphy (J. Stone & Co.), Mr. D. A. Oliver (B.S.A. group), Dr. G. J. Smithells (British Aluminium Co.), Dr. C. Sykes (Brown Firth), and Dr. W. H. J. Vernon (Chemical Research Laboratory).

Domestic Heating Handbook

At the request of the Inter-Departmental Committee on Domestic Heating of the Ministry of Fuel and Power, a handbook has been issued which consists of all published B.S. specifications (abridged and correlated) concerned with improving the fuel efficiency of household appliances. The book is divided into three parts (gas, electricity and solid fuel) and takes cooking, water heating, refrigeration, lighting and other devices into account. There is an additional section on the supply, installation and maintenance of the appliances dealt with. This B.S. Handbook No. 5, 1947 edition, is obtainable for 12s. 6d. from the British Standards Institution, 24, Victoria Street, London, S.W.1.

Mathematical Tables for Industry

A special committee of the Royal Society has been established to continue and extend the earlier work of the British Association in the production of mathematical tables. This Committee would be glad to receive suggestions from industrial research groups, from individual investigators and from Service departments relating to their special needs. Requests for assistance may be met either by advice on production, by production under the auspices of the Royal Society, or by a grant towards the cost of tabulation. Inquiries should be addressed to the Assistant Secretary, The Royal Society, Burlington House, London, W.1.

Government Electrical Specifications

The Committee on the Standardization of Electrical Cables and Wires for Government Services (secretary's address: I.E.M.E., M.O.S., "Walsingham," Chislehurst, Kent) has recently issued Amendment Slip No. 1 for Specifications Nos. 1, 8 and 9. The amendment in each case mainly concerns the substitution of natural rubber (to G.D.E.S.16) for synthetic rubber as an insulant. Copies of the amendment slip can be obtained from H.M. Stationery Office, price 1d. each.

Fan Terminology

As part of an endeavour to induce terminological uniformity among fan makers, there has been issued publication No. 1/1948 which defines terms, types, component parts, directions of discharge, inlet angles, etc. This 12-page booklet, illustrated with sketches and pressure diagrams, is obtainable for 2s. 6d., from the Fan Manufacturers' Association, 23, Queen Square, London, W.C.1.

Electrical Manufacturing in South Africa

The Department of Commerce and Industries of the Union of South Africa announces several new developments in electrical manufacture. A Johannesburg firm of electrical engineers, which produces ironclad electric switches and metal wall-boxes for flush-type switches and outlets, has designed and patented what is described as "a novel type" of water heater, an immersion heater being contained in a relatively narrow cylinder on the outside of an insulated 40-gal. storage tank. It is claimed that water is thus heated much more rapidly than by placing the heater inside the tank.

Electric water heaters of 20- and 30-gal. capacities will shortly be manufactured in Johannesburg by a new firm under licence from its British principals. A feature of these heaters is that they are fitted with two independent heating units, one near the top and the other at the bottom. The Department further records that a firm manufacturing ironclad switches, motor control gear, etc., is adding magnetic separators to its range.

Electricity Output

During the week ended 23rd July 676·4 million kWh was sent out for public supply from solid fuel fired stations (representing approximately 96 per cent of the total electricity sent out for public supply by the British Electricity Authority and the North of Scotland Hydro-Electric Board). This was 47·7 million kWh less than in the previous week but 88·4 million kWh more than in the corresponding week last year.

Coal stocks at electricity undertakings at 24th July were 4,011,500 tons, while coal consumed during the week ended 24th July totalled 459,800 tons.

More Diesel Generating Plant

As a precautionary measure against the possibility of further load shedding during the coming winter, the Skefco Ball Bearing Co., Ltd., has installed a 1,000-kW diesel generating unit of General Motors manufacture at its Luton factory. The engine is of the sixteen-cylinder, two-stroke type developing 1,440 b.h.p. at 750 r.p.m., and is direct coupled to a 400-V three-phase four-wire alternator. Five similar units of the same make were described in the *Electrical Review* of 9th January, 1948.

Aircraft Electrical Equipment

We are informed by Clang, Ltd., that they have supplied terminal blocks and 2-pin plug and socket connectors for use in the wiring of the new " Fokker " F.25 " Promotor " 4-seater private aeroplane which has been demonstrating at Langley Aerodrome.

Watford Electricity Jubilee

A brief history of the Watford Corporation electricity undertaking during the fifty years of its existence has recently been published.

Television in the United States

The Minister (Commercial) at the British Embassy in Washington has reported that according to the Federal Trade Commission there are twenty-two television stations at present in operation in the United States; construction of an additional seventy-one has been authorized and applications relating to 192 more are under consideration by the Federal Communications Commission. It is estimated that there are more than 200,000 television receiving sets in use, of which 180,000 represent retail sales during 1947. Production of new television receivers during 1948 is expected to amount to 600,000. In Washington alone about 700 new sets are being sold each month.

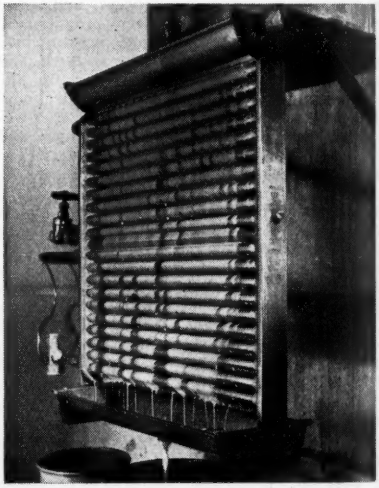
Malayan Sound Reproduction System

The Council Chamber of the new Federation of Malaya is equipped with a comprehensive sound system installed by the General Electric Co., Ltd. Multi-point, low level sound reinforcement rather than " public address " is the keynote of the system and each of the thirty-three ribbon type microphones is placed so that no member or official need do more than turn slightly to right or left when he rises to speak. Thirty loudspeakers are distributed around the members' tables and a further eight are hung on the walls.

Clean Milk Production

Last week we had a pre-view of the new E.D.A. film entitled " Clean Milk Production." The film, which is 16 mm. and has been photographed in " Kodachrome," depicts a tour of three typical dairy farms and shows how electricity can be used for all services connected with the production of milk.

The film has been excellently produced by Dennis Ward and has been made by the Times Film Co., Chester, with the collaboration of the Milk Marketing Board and the approval of the Ministry of Agriculture. The three farms



Milk cooling plant : A " still " from the new E.D.A film

chosen are of varying size and no attempt is made to introduce " luxury " uses of electricity, all the applications shown indicating that electrification can save money, time and labour. The film is intended primarily for showing to the farming and rural community, particularly

to young farmers' associations, and applications to exhibit the film can be made to the British Electrical Development Association, 2, Savoy Hill, London, W.C.2, or through the Area Electricity Boards or local electricity undertakings.

While the film will, of course, appeal mainly to the farming community, there is much in it of interest to the general public, and Mr. V. W. Dale, general manager and secretary of E.D.A., hinted at the pre-view that an abridged version might be prepared for showing in cinemas.

Engineers' Wage Claim Inquiry

The Minister of Labour announced last week that, after consultation with both the employers' and employees' sides, he had decided to set up a court of inquiry into the wage claims of engineers. A similar inquiry is to follow into the shipbuilders' claim. The court of inquiry on the application which was rejected by the Engineering Employers' Federation is expected to begin its hearings in the middle of August. The following have been appointed to constitute the court:—Sir John Forster (chairman) and Messrs. C. W. Guillebaud, G. G. Honeyman, A. J. Espley and Alfred Roberts.

Diesel Plant for Pakistan

Associated British Oil Engines, Ltd., has received an order for five 350-kW Petter-Brush diesel-electric generating sets for delivery to Pakistan. These sets, which are to be installed in a new factory being built for the Sadiq Vegetable Ghee & Allied Industries, Ltd., are intended to provide power for the various types of equipment which will be installed for processing oils and fats. Each set will comprise a Petter " SS6 " six-cylinder superscavenge two-stroke diesel engine rated at 576 b.h.p. at 600 r.p.m. direct coupled to a Brush 350-kW alternator of the salient pole, protected, single pedestal bearing type wound for 400/440 V, 3 phase, 50 cycles.

New Southern Rhodesian Factory

The Micramatic Electrical Instrument Co., Ltd., of Congleton, Cheshire, has opened a branch factory in Bulawayo, Southern Rhodesia, for the manufacture of refrigerators, air conditioning equipment and fluorescent lighting equipment.

Dissolutions of Partnership

John Thomas Jarvis, James Theodore Jarvis, and **S. A. Jarvis,** carrying on business as electrical engineers at 18, Rosemary Avenue, Goldthorn Park, Wolverhampton, as " Jarvis Electricians," have dissolved partnership. John Thomas and James Theodore Jarvis will carry on business on their own account at 18, Rosemary Avenue, Goldthorn, Wolverhampton, and S. A. Jarvis will carry on business on his own account at 120, Fairview Road, Penn, Wolverhampton. John Thomas and James Theodore Jarvis will attend to debts due to, or owing by, the late firm.

F. G. Lester and **F. W. Strange,** carrying on business as radio engineers, radio dealers and retailers and agents at 16, Carnarvon Road, Leyton, Essex, under the style of Radio Unlimited, have dissolved partnership. Mr. Strange will attend to debts and carry on the business.

Automatic Train Describers

Included in the plan to electrify and re-signal the Liverpool Street to Romford section of the British Railways (Eastern Region) is the provision by the General Electric Co., Ltd., of the largest set of train describing equipments ever installed under single contract. The heavy suburban and main-line traffic that the line is planned to carry cannot be handled expeditiously by signalmen using the existing train describing system, which is therefore to be replaced by modern automatic telecommunication apparatus. The new train describers will not only show the positions and destination of the first three trains into a section, but will also " memorize " these facts regarding any other approaching trains. A system somewhat similar to that to be installed was provided by the G.E.C. on the Romford-Shenfield line in 1933.

New Fluorescent Lamps

With reference to the notice in our issue of 23rd July last relating to the introduction on the market by E.L.M.A. members of " natural " colour fluorescent lamps, we stated that the list price of the 3-ft 30-W lamps would be 11s. 6d. each. This price is only applicable to the 1½-ft 15-W lamps, the price of the 3-ft lamps being 13s.

Japanese Lamp Sales

Japanese manufacturers and suppliers of miniature electric bulbs have been authorized to negotiate directly with buyers on export sales for their 1948 production. Heretofore, the supply situation has required that negotiations for export contracts involving bulbs be conducted through Boeki Cho, the Japanese Government's official Board of Trade. The quantity and price of bulbs sold will be determined in the direct negotiations between buyers and sellers. Contracts confirming sales will be signed by Boeki Cho, and validated by the Supreme Commander, Allied Powers, in Tokyo.

Decorative Plastic Material

For some years now a decorative laminated plastic material has been manufactured in the United States under the trade name of " Formica." The material is extremely durable and it is virtually impossible to burn or scratch it, or stain it with acid or oil. A " cigarette proof " grade is manufactured which recently withstood the stubbing of 20,000 cigarettes without leaving

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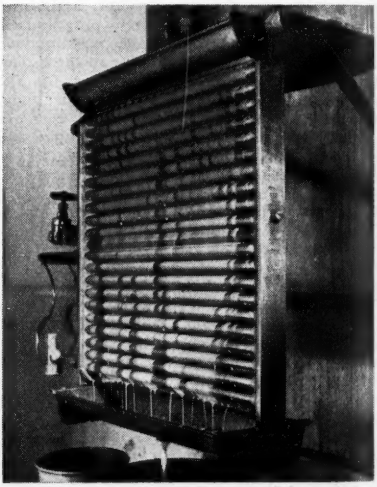
Malayan Sound Reproduction System

The Council Chamber of the new Federation of Malaya is equipped with a comprehensive sound system installed by the General Electric Co., Ltd. Multi-point, low level sound reinforcement rather than " public address " is the keynote of the system and each of the thirty-three ribbon type microphones is placed so that no member or official need do more than turn slightly to right or left when he rises to speak. Thirty loudspeakers are distributed around the members' tables and a further eight are hung on the walls.

Clean Milk Production

Last week we had a pre-view of the new E.D.A. film entitled " Clean Milk Production." The film, which is 16 mm. and has been photographed in " Kodachrome," depicts a tour of three typical dairy farms and shows how electricity can be used for all services connected with the production of milk.

The film has been excellently produced by Dennis Ward and has been made by the Times Film Co., Chester, with the collaboration of the Milk Marketing Board and the approval of the Ministry of Agriculture. The three farms



Milk cooling plant : A " still " from the new E.D.A film

chosen are of varying size and no attempt is made to introduce " luxury " uses of electricity, all the applications shown indicating that electrification can save money, time and labour. The film is intended primarily for showing to the farming and rural community, particularly

to young farmers' associations, and applications to exhibit the film can be made to the British Electrical Development Association, 2, Savoy Hill, London, W.C.2, or through the Area Electricity Boards or local electricity undertakings.

While the film will, of course, appeal mainly to the farming community, there is much in it of interest to the general public, and Mr. V. W. Dale, general manager and secretary of E.D.A., hinted at the pre-view that an abridged version might be prepared for showing in cinemas.

Engineers' Wage Claim Inquiry

The Minister of Labour announced last week that, after consultation with both the employers' and employees' sides, he had decided to set up a court of inquiry into the wage claims of engineers. A similar inquiry is to follow into the shipbuilders' claim. The court of inquiry on the application which was rejected by the Engineering Employers' Federation is expected to begin its hearings in the middle of August. The following have been appointed to constitute the court:—Sir John Forster (chairman) and Messrs. C. W. Guillebaud, G. G. Honeyman, A. J. Espley and Alfred Roberts.

Diesel Plant for Pakistan

Associated British Oil Engines, Ltd., has received an order for five 350-kW Petter-Brush diesel-electric generating sets for delivery to Pakistan. These sets, which are to be installed in a new factory being built for the Sadiq Vegetable Ghee & Allied Industries, Ltd., are intended to provide power for the various types of equipment which will be installed for processing oils and fats. Each set will comprise a Petter " SS6 " six-cylinder superscavenge two-stroke diesel engine rated at 576 b.h.p. at 600 r.p.m. direct coupled to a Brush 350-kW alternator of the salient pole, protected, single pedestal bearing type wound for 400/440 V, 3 phase, 50 cycles.

New Southern Rhodesian Factory

The Micramatic Electrical Instrument Co., Ltd., of Congleton, Cheshire, has opened a branch factory in Bulawayo, Southern Rhodesia, for the manufacture of refrigerators, air conditioning equipment and fluorescent lighting equipment.

Dissolutions of Partnership

John Thomas Jarvis, James Theodore Jarvis, and **S. A. Jarvis**, carrying on business as electrical engineers at 18, Rosemary Avenue, Goldthorn Park, Wolverhampton, as " Jarvis Electricians," have dissolved partnership. John Thomas and James Theodore Jarvis will carry on business on their own account at 18, Rosemary Avenue, Goldthorn, Wolverhampton, and S. A. Jarvis will carry on business on his own account at 120, Fairview Road, Penn, Wolverhampton. John Thomas and James Theodore Jarvis will attend to debts due to, or owing by, the late firm.

F. G. Lester and **F. W. Strange,** carrying on business as radio engineers, radio dealers and retailers and agents at 16, Carnarvon Road, Leyton, Essex, under the style of Radio Unlimited, have dissolved partnership. Mr. Strange will attend to debts and carry on the business.

Automatic Train Describers

Included in the plan to electrify and re-signal the Liverpool Street to Romford section of the British Railways (Eastern Region) is the provision by the General Electric Co., Ltd., of the largest set of train describing equipments ever installed under single contract. The heavy suburban and main-line traffic that the line is planned to carry cannot be handled expeditiously by signalmen using the existing train describing system, which is therefore to be replaced by modern automatic telecommunication apparatus. The new train describers will not only show the positions and destination of the first three trains into a section, but will also " memorize " these facts regarding any other approaching trains. A system somewhat similar to that to be installed was provided by the G.E.C. on the Romford-Shenfield line in 1933.

New Fluorescent Lamps

With reference to the notice in our issue of 23rd July last relating to the introduction on the market by E.L.M.A. members of " natural " colour fluorescent lamps, we stated that the list price of the 3-ft 30-W lamps would be 11s. 6d. each. This price is only applicable to the 1½-ft 15-W lamps, the price of the 3-ft lamps being 13s.

Japanese Lamp Sales

Japanese manufacturers and suppliers of miniature electric bulbs have been authorized to negotiate directly with buyers on export sales for their 1948 production. Heretofore, the supply situation has required that negotiations for export contracts involving bulbs be conducted through Boeki Cho, the Japanese Government's official Board of Trade. The quantity and price of bulbs sold will be determined in the direct negotiations between buyers and sellers. Contracts confirming sales will be signed by Boeki Cho, and validated by the Supreme Commander, Allied Powers, in Tokyo.

Decorative Plastic Material

For some years now a decorative laminated plastic material has been manufactured in the United States under the trade name of " Formica." The material is extremely durable and it is virtually impossible to burn or scratch it, or stain it with acid or oil. A " cigarette proof " grade is manufactured which recently withstood the stubbing of 20,000 cigarettes without leaving

a trace of burn, blister or stain. De La Rue Insulation, Ltd., Imperial House, Regent Street, London, W.1, announce that the necessary manufacturing rights have been acquired and that all grades of the material are now generally available in the United Kingdom.

Locomotive Standards

In order to simplify maintenance and the ordering of spare parts, the Locomotive Manufacturers' Association of Great Britain has adopted a single standard works practice in regard to limits and fits. The standards are applicable to all types of engines—electric, diesel and steam. Particulars are set out in a publication entitled "Limits and Fits for Locomotive Work," which is expected to form the basis for world-wide specifications.

Trade Announcements

Julius Sax & Co., Ltd., announce that they have vacated their temporary offices and works at Chiswick and have moved to a new factory, at 24, Commerce Road, Brentford, Middlesex (telephone: Ealing 6034/5).

Ekco-Ensign Electric Ltd., have closed their Bristol depot and in future the Western Area will be served direct from the London depot at 9, Whitcher Place, Rochester Road, N.W.1. Representatives in the Bristol district will continue to maintain local contact.

Technical and Scientific Register

A revised leaflet (P.L.217) has been issued by the Ministry of Labour and National Service explaining the scope and functions of the Technical and Scientific Register.

Changes of Name

The following companies have changed their names: W. E. Knorr & Co., Ltd., to W.E.K. (Electrical), Ltd.; Hairdressers' Electrical Supplies & Maintenance, Ltd., to Electrical Supplies & Maintenance (Bristol), Ltd.; Farrant (Electrical Fittings), Ltd., to F. J. Parish & Son (Radio & Electrical Engineers), Ltd.; Fanol Manufacturing & Trading Co., Ltd., to Torch Products (London), Ltd.; Fluorescent Lamps, Ltd., to Fluorescent Products, Ltd.

Motor Inquiry from Canada

The National Sewing Machine Company, 652, Bloor Street West, Toronto, requires 115-V fractional-h.p. motors and rheostats (controls) for domestic sewing machines. Further information is obtainable from the Export Promotion Department, Thames House North, Millbank, London, S.W.1 (Ref. 33844/48).

Liverpool Exhibition

Liverpool manufacturers show what they can do in the "Liverpool Can Make It" exhibition being held this week in the Wavertree Playground. Organized by the Industrial Advisory Council, there are 120 industrial displays, in which prominence is given to electrical products. One of the largest exhibits is that of the Automatic Telephone & Electric Co., Ltd. The Electrical Contractors Association has an attractive bureau where they sport the slogan, "Liverpool Can't Make It Without the Help of Electrical Contractors." Other electrical exhibitors are: Elexcel, Ltd., Electric Service Co., Harbrix Industries, Ltd. (water heaters), Liverpool Engineering & Diecasting Co., Ltd., and Winstanley & Lambert, Ltd. Many of the stands are lighted by fluorescent tubes and one exhibitor, Lever Products, Ltd., displays an arrangement employing circular tubes, of a total rating of 240 W, on an aluminium ceiling fitting.

Reduced Demand for Meters

Owing to a falling off in the demand for electricity meters, Ferranti, Ltd., have put about 1,500 employees in the meter department of their Hollinwood works on a four-day working week.

Linesman's Death

A linesman employed in No. 6 sub-area of the Yorkshire Electricity Board received a fatal electric shock while working on a line at Burton Pidsea and at the inquest at Withernsea, which lasted four hours, a verdict of "Death by misadventure" was recorded. The foreman of the jury referred to what he called "a lack of co-operation" between the Hornsea and Withernsea districts while they were working from different ends of the same line, and said the jury felt that there should be one man in complete charge. There should also be one switch to cut off all power. The coroner said these recommendations would be passed on to the Board.

Trade Publications

Thorn Electrical Industries, Ltd., 105-109, Judd Street, London, W.C.1.—Priced leaflet on the complete range of "Atlas" fluorescent fittings.

The Jackson Electric Stove Co., Ltd., 143, Sloane Street, London, S.W.1.—Priced leaflet on the 194J "Cleanline" cooking cabinet.

The Chloride Electrical Storage Co., Ltd., Exide Works, Clifton Junction, Manchester.—Catalogue of car batteries and associated accessories.

The Arora Co., Rosebery Street, Loughborough.—Priced leaflet on an infra-red ray projector and a car radiator heater.

Pye, Ltd., Telecommunication Division, Cambridge.—Technical folder describing mobile radio-telephone equipment.

Early Crops, Ltd., 84, Ladbrook Road, Solihull, Warwickshire.—Illustrated pamphlet on soil heating, seed germination and hydroponic equipment.

High Duty Alloys, Ltd., Slough, Bucks.—Technical folder on Hidumidium high-duty alloys.

ELECTRICITY SUPPLY

Uniform Lighting on Tyneside.

Brighton. — SHOREHAM HARBOUR ALTERATIONS.—To enable 4,500-ton colliers to supply fuel to the new Southwick "B" power station a plan for alterations to Shoreham Harbour has been prepared by Sir William Halcrow & Partners, consulting engineers to the British Electricity Authority. The Harbour trustees are submitting the scheme to Rendel, Palmer & Tritton, consultants, for advice.

Cuckfield.—ELECTRICAL INSTALLATIONS.—It was stated at a meeting of the Rural District Council that tenders were to be invited for the installation of electricity in existing Council houses. The work is to be done district by district.

Scotland.—SLOY TRANSMISSION LINES.—The North of Scotland Hydro-Electric Board's Sloy Transmission Lines Scheme (Constructional Scheme No. 5) has been confirmed by the Secretary of State for Scotland and laid before Parliament. It provides for the erection of transmission lines to link up the new generating station being constructed at Inveruglas on the west side of Loch Lomond (already approved under the Loch Sloy Scheme) with the main transmission lines of the British Electricity Authority near Drumchapel (Glasgow). The cost of the scheme is estimated at £910,000. Objections lodged against the Scheme have all been withdrawn.

Sheffield.—UNDERTAKING'S DEFICIT. — There was a net deficiency of £319,837 on the 1947-48 year's working of the electricity undertaking.

Tyneside.—UNIFORM STREET LIGHTING.—Representatives of thirteen Tyneside local authorities together with officials of the North Eastern Electricity Board and the Newcastle & Gateshead Gas Co., Ltd., recently held a conference at North Shields to discuss a uniform system of street lighting. The local Councils in the area are being urged to adopt a standard time for lighting and putting out lamps on main roads and connecting roads. The question of adopting uniform times for other streets is being considered.

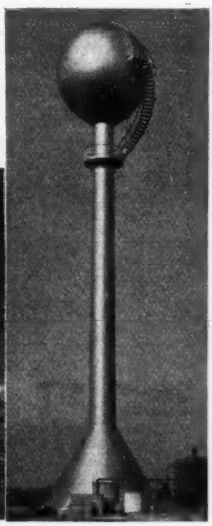
Calcutta Railway Electrification.

TRANSPORT

India.—CALCUTTA RAILWAY ELECTRIFICATION SCHEME.—The Principal United Kingdom Trade Commissioner at Calcutta reports that a Committee appointed by the Government of India in January, 1947, to investigate the problem of railway terminal facilities at Calcutta has recently issued its report. The Committee recommends that all the three railway lines serving Greater Calcutta, and leading into Sealdah and Howrah stations (representing a total of 274 route miles, including new links) should be electrified, either simultaneously or in two stages in quick succession, and that Calcutta should be girdled by a circular electric railway, partly overhead and partly on ground level, of a total length of 30¾ miles. At a later stage a further electrification of 13½ miles of main lines beyond the limits of Greater Calcutta is also recommended. The total cost of this work is estimated at Rs. 13·47 crores (£10,102,500) for electrification and Rs. 6·38 crores (£4,705,000) for engineering works.

Sunderland.—TRAMWAY EXTENSION.—A tram-track extension in Durham Road is expected to be completed by November.

The Sarasota generating station, Florida, has a 50,000 - gal. spherical water tower supported 122 ft above ground level on a pedestal



Production for Export—IX

Transformers and Rectifiers

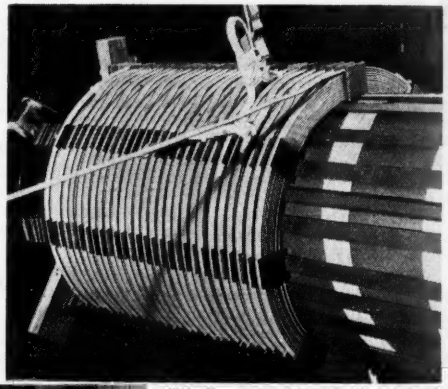
WITH 80 per cent of their transformers and 60 per cent of their glass-bulb rectifier manufactures being shipped abroad, London Transformer Products, Ltd., can claim to be doing their share of export business. This high proportion has not been achieved by limiting the home market, since the new factory at Bridgend, South Wales, provides facilities for more than doubling the output and extending the range of transformers, whilst the factory at Willesden, London, is retained for the smaller units up to 10 kVA.

All types and sizes of transformers up to 1,000 kVA and 33,000 V are produced and the projected factory extension of a further 20,000 sq ft will increase this range to 2,000 kVA. In addition to the larger power, distribution and pole mounting types a wide variety of transformers is produced for special applications, including air-cooled, oil-cooled and tropically treated transformers for salt-bath and resistance furnaces, radio-frequency heating, rectifier equipment and high-power radio transmitters, etc.

Cores, with limbs of cruciform section, are cut from insulated silicon steel sheet and rigidly clamped by end frames of channel or angle section. Spiral, crossover or continuous disc type coils are wound with paper or paper and enamel insulated conductors and are thoroughly dried out and

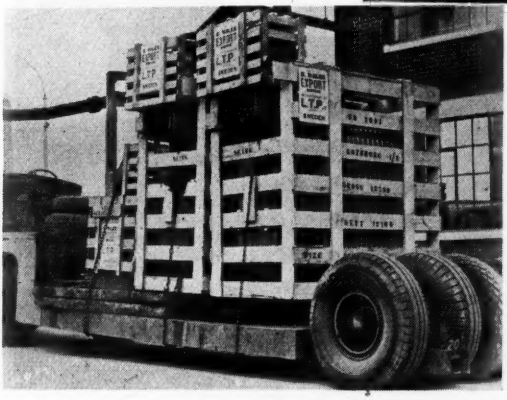
DESIGNS TO MEET SPECIALLY EXACTING CONDITIONS

vacuum impregnated in special thermo-setting varnish. The tanks are completely manufactured at Bridgend, cooling tubes bent to suit requirements and special attention given to obtain a robust construction for shipment abroad. Care is taken to remove rust and welding scale by shot blasting, then the tanks are pressure tested at 5 lb per sq in., subsequently coated inside with oil-proof enamel to reduce contamination of the oil and finally the exterior is given three coats of paint to form a durable and weatherproof finish suitable to meet all climatic conditions.



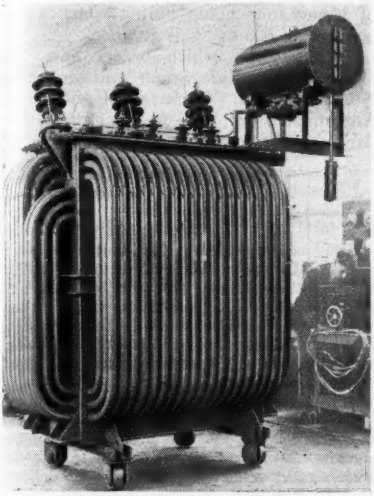
Winding a continuous disc h.v. coil for use in a 1,000-kVA, 11-kV transformer

All connections are adequately supported and although coils and insulation are pre-shrunk before assembly, provision is made for adjustment of end frames should any further shrinkage occur in service, and the larger transformers are fitted with steel end rings to ensure sufficient mechanical strength to the assembly under short circuit conditions.



Consignment of 1,000-kVA transformers ready for dispatch to Stockholm

In designing equipment for overseas considerable care is taken to meet not only abnormal operation conditions, but also to modify construction to suit local preferences. Although most transformers are built to B.S.S. 171/1936, many overseas clients, especially those on the Continent, submit their own particular standards. Exemplifying

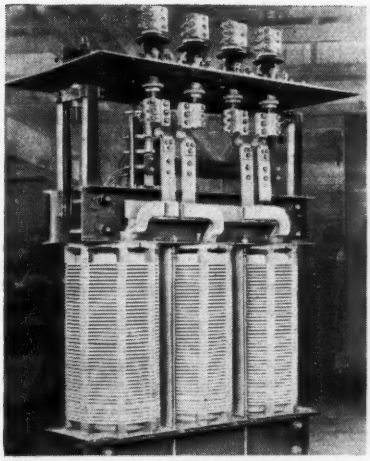


A 1,000-kVA, 20,000/5,700-V transformer for Sweden, incorporating special fittings including swivel rollers, thermostat and provision for Buckholz relay. It is designed to withstand tests in accordance with Swedish Standards Bureau of 55 kV on h.v. and 20 kV on secondary windings

the higher test voltages required in Sweden, several 1,000-kVA transformers with a ratio of 11,000 to 400 V changeable by means of parallel connections to 3,300 to 400 V with adjustment tappings in both positions, have the high-voltage side insulated for a test of 30,000 V.

Many transformers have been supplied to South Africa and special care has been taken in the design of units operating in severe lightning areas, combined with the necessary consideration with regard to temperature rise when operating at many thousands of feet above sea level. Above 3,300 ft the temperature rise of the oil must be reduced by 1 per cent for each 1,000 ft above sea level, and therefore the physical size of transformers is considerably increased when operating at altitudes of 8,000–10,000 ft.

An interesting order for a South African



L.v. connections on a 1,000-kVA, 11-kV/400-V star/star connected outdoor type with bushings and tapping switch brought out through the lid

mine is a 1,000-kVA transformer designed to operate at the bottom of the mine shaft, to supply an induction motor driving the winding gear, and to withstand the severe mechanical stresses and overloads due to the frequent stopping and starting of the winding gear.

Most transformers are shipped abroad

The final operation before annealing and evacuating a 3-arm, 250-A mercury-arc rectifying bulb: the pumping stem being joined to one of the main arms

complete with first filling of oil, but several units for Syria were recently shipped at the customer's request with the tanks filled with dry air at a pressure slightly above atmospheric.

Several overseas customers specify special fittings and refinements that are not usually required on transformers below 1,000 kVA for use in this country. These include Buckholz relays, thermometers with signalling contacts, thermostats, swivel rollers, earthing devices, jacking lugs, in addition to the normal requirements of expansion vessels, silica gel breathers, and cable sealing and disconnecting boxes.

All components for mercury-arc rectifiers are produced in the Bridgend factory, the present limit for size being 500 A. The bulb is fabricated by fusing the various arms to the main body, the glass used being of high thermal shock characteristics. The anodes are assembled to sealing rods by means of an interlocking device. When assembly is complete the bulb is annealed over a period of twenty-four hours during which a temperature of 600 deg C is attained.

Countries for which orders have been undertaken include South Africa, Sweden, Norway, India, Pakistan, Egypt, Syria, Argentina, Brazil, Turkey and Eire.

Progress in Eire

EXTENSIVE CONSTRUCTION WORK

TO overtake the deficiency in generating plant capacity the Electricity Supply Board of Eire has in hand an extensive programme of major new works. These include six generating stations, two on the River Erne at Cliff and Cathaleen's Falls, one on the River Liffey at Leixlip, two turf-fired stations at Portarlington and Allenwood (Co. Kildare) and an oil-fired station at North Wall, Dublin. The capital cost of these stations, together with the associated main 110-kV transmission system entensions, amounts to £8,000,000.

Six New Generating Stations

Describing the progress of the schemes in its twenty-first annual report (to 31st March last) the Board says that one of the two 12,500-kW sets for the Portarlington turf station has been completed at the manufacturer's works. Installation of boiler plant has commenced and two 20,000-kVA transformers have been erected at the station, which it is aimed to have in commission by next spring. The Cliff station is designed for 20,000-kW capacity in two sets, the first of which should be in commission by the end of 1949. The Cathaleen's Falls station will ultimately have three sets with a combined capacity of 60,000 kW and the first is scheduled for service towards the end of 1950, with the second in the middle of the following year. Erection of a 4,000-kW Kaplan turbine has been proceeding at Leixlip and the station should be ready next spring. Also early next year the North Wall oil-fired station, on the site of the Irish National Refineries, should be in commission, the 12,500-kW turbo-alternator having been delivered. The 40,000-kW Allenwood turf station is planned for the 1951 winter load. Besides these new stations, boiler plant and coal and ash handling equipment are being installed at Pigeon House (Dublin). Main transmission extensions will add 338 miles to the present system of 487 miles.

The past year has furthermore witnessed considerable activity under the Rural Electrification Scheme for supplying houses in selected areas (each approximately 25 sq miles in extent) without capital contributions from the consumers. Unlike the position in Northern Ireland, work has not apparently been seriously handicapped by shortages of materials. Some 100,000 poles were procured from the Baltic during the year and stocks were accumulated at Dublin and Cork ports. Although deliveries of conductors, insulators, ironwork and transformers were erratic, sufficient quantities were delivered to keep construction crews working. Because of the high price of copper conductor, large orders were placed for steel reinforced aluminium conductor. Work was completed, or almost finished, in eleven areas and was proceeding in fifteen others. In the last quarter of the year 320 miles of line were erected.

Record Shannon Output

Very favourable water conditions enabled a record output of 381 million kWh to be obtained from the Shannon station. The aggregate output for the year (all stations) was 618 million kWh, an increase of 48 million on 1946-47, and it was possible to avoid any load curtailment, although the general restrictions continued in force. Sales totalled 492·2 million kWh to 262,598 consumers at an average price of 1·88d. (against 453·7 million kWh to 248,030 consumers at 1·90d. in the previous year).

Gross revenue was £3,886,479 (£3,608,639); working expenditure, including depreciation, £2,779,660 (£2,352,783); interest and repayment charges, etc., £1,031,823 (£1,006,916); and net surplus £74,996 (£248,940). Sales of appliances amounted to £153,102 compared with the previous year's £99,791. Referring to the rise in costs, the report says that unless these diminish in the near future charges may have to be increased.

FINANCIAL SECTION

Reports and Dividends

Conversion of Securities.—The British Electricity Authority announces that the conversion date for the following securities having been declared by order of the Ministry of Fuel and Power to be 31st July, holders of the said securities became instead on that date holders of British Electricity 3 per cent Guaranteed Stock, 1968-1973, calculated in accordance with the rates shown for each £1 nominal on the old securities; a first payment of six months' interest on the Electricity Stock will be made on 1st October:—Borth & Ynyslas Electric Supply Co. ordinary (£1 1s. 0d.); Bridgwater & District Electric Supply & Traction Co. ordinary shares (£4 5s. 0d.); Cark & District Electricity Co. ordinary shares (£4 7s. 6d.); Mid-Wales Electric Power Co. 4½ per cent mortgage debenture stock (£1 0s. 9⅜d.); ditto ordinary shares (1s. 6d. per 2s. share); South Wales E.P. Co. 5 per cent irredeemable debenture stock (£1 7s. 0d.); Wisbech Electric Light & Power Co. 7 per cent debenture stock (£1 11s. 6d.).

Vactric, Ltd., announces that, subject to ratification by the shareholders, it has concluded an agreement with the Treasury under which an advance to the company will be made of £500,000 in accordance with the provisions of Section 4 of the Distribution of Industry Act, 1945. The loan will bear interest of 4 per cent per annum, and be repayable within five years. In addition the company will have overdraft facilities from its bankers up to £250,000. The company is to set aside £150,000, or such lesser sum as its financial adviser shall certify, and within two months from 31st March, 1949, is to pay two-thirds of the sum to the Treasury and one-third to the company's bankers. For the second and each succeeding financial year after the date of the agreement it is to pay a sum equal to 50 per cent of the net profits to the Treasury towards repayment until the loan has been repaid, and a sum equal to 25 per cent of the net profits to the bank. No dividends on the ordinary shares will be paid without consent of the Treasury. Sir Andrew Macharg has been appointed financial adviser to the company, and Mr. J. Paterson, late managing director of the Clyde Valley Electrical Power Co., Mr. D. W. L. Menzies, managing director of Bonnington Castings, and Mr. C. R. D. Brown, managing director of Scottish Precision Castings, have been invited to join the board.

The accounts for the year ended 31st March last show a net loss of £21,004 and after adjusting for war contracts the loss was £33,717. After bringing in dividend receivable from subsidiary company, providing for tax and deducting the balance brought in (less preference dividend for six months ended 30th September, 1947), the accumulated loss is £30,952 (against a net profit of £101,672). The group's loss for the year is £13,398, and after appropriations and including balance brought in, the accumulated loss carried forward is £9,543.

Company News
Stock Exchange Activities

The Electric Construction Co., Ltd., reports a gross profit of £286,991 for the year ended 31st March last, as compared with £201,551 for the preceding year, and a net profit of £98,405 (against £58,320), to which is added £39,773 brought in, making £138,178. After providing £20,500 for profits tax, placing £51,000 to income tax reserve, and transferring £5,000 to employees' superannuation reserve, it is proposed to pay a dividend of 12½ per cent for the year (same) on the ordinary stock and to carry forward £37,203.

In his statement issued with the report and accounts, Mr. G. W. Spencer Hawes (chairman) says that although adequate supplies of some raw materials are still difficult to obtain, the company looks forward to the current year's operations with more optimism than was felt a year ago. It is doing a very considerable export trade which amounts in volume to three times that of pre-war years.

Telephone Rentals, Ltd.—Presiding at the recent annual meeting, Mr. F. T. Jackson (chairman), said that the year under review had been one of consolidation. The shortage of supply of raw materials and equipment was not now so acute, but after consideration not only of the material position in 1947, but of the possible trend of trade during the next few years, they felt convinced that their policy should be to concentrate on the needs of existing subscribers. Their training system for engineers in telecommunications and time control had proved a profitable enterprise both in the maintenance of existing systems and in the installation and maintenance of more modern equipment. The directors proposed to issue 500,000 4½ per cent cumulative preference shares to finance the rapid growth of the company, and application was being made to the Capital Issues Committee for the necessary permission.

The Horstmann Gear Co., Ltd., is reconstructing its capital to bring it more into line with present-day requirements. The existing company is in voluntary liquidation with Mr. R. H. Jarritt, Clare Street, Bristol, as liquidator and a new company with the same name and a nominal capital of £200,000 has been registered. There will be no change in the directorate membership or management of the company.

Greenwood & Batley, Ltd., report a gross profit of £134,651 for the year ended 31st March, compared with £86,226 in the previous year. The net profit fell from £52,844 to

£40,904 after providing £64,959 (£9,488) for taxation. The reserve fund again receives £10,000 and a final dividend of 10 per cent again makes 15 per cent, leaving £70,924 (£72,628) to be carried forward.

Venner Time Switches, Ltd., are paying a dividend of 5 per cent. No distribution was made in the preceding year. The profit for 1947, before taxation, but including a surplus on stocktaking not wholly attributable to the year, was £19,452 (£7,315).

The Cables Investment Trust, Ltd., records a net profit of £346,739 for the year ended 30th June, compared with £296,118 for the previous year. The final dividend is maintained at 3 per cent, making 5 per cent (same).

Ward & Goldstone, Ltd.—In referring to the accounts of this company for the year ended 31st March last, we incorrectly stated that the net profit was £132,724. The figure should have been £240,124.

E. K. Cole, Ltd., has reduced its interim dividend from 8 to 6 per cent.

New Companies

Crews-Green, Ltd.—Registered 24th July. Capital, £10,000. Manufacturers of, and dealers in, electrical, wireless, television and telephone appliances, etc. Subscribers: E. H. Wiseman and W. Davies. Solicitors: J. D. Langton & Passmore, 8, Bolton Street, W.1.

Herberts Electrical, Ltd.—Registered 26th July. Capital, £2,000. To acquire the business of electrical contractors carried on by Herberts (North Wales), Ltd., as part of their business at 1, Rhos Road, Rhos-on-Sea, Colwyn Bay. H. Hodkinson and M. F. Edwards, jun., are the first directors. Secretary: James Bennett. Regd. office: 1, Rhos Road, Rhos-on-Sea, Colwyn Bay.

Country Electric & Power, Ltd.—Registered 15th July. Capital, £2,000. Electrical engineers, etc. Directors: C. G. McCombe and L. Britton. Regd. office: 5, Smithfield Square, Lisburn.

F. J. Contract Services, Ltd.—Registered 23rd July. Capital, £1,000. Manufacturers, factors, repairers of, and dealers in, radio and television receivers, apparatus and accessories, broadcasting apparatus and appliances, refrigerators, vacuum cleaners, accumulators and electrical equipment, etc. Permanent directors: R. E. Fletcher, G. L. Jaye and Emmeline L. Kay. Secretary: Mrs. Violet Fletcher. Regd. office: 254, Lee High Road, S.E.13.

Liquidations

Francis Lamp Locks, Ltd.—Winding up voluntarily. Liquidator, Mr. G. D. Haynes, 7, Great Castle Street, London, W.1. Particulars of claims to the liquidator by 30th August.

This notice is purely formal. All creditors of the company have been or will be paid in full.

Trade Marks

APPLICATIONS have been made for the registration of the following trade marks. Objections may be made within a month from 28th July:—

AMBASSADOR. No. 661,432, Class 7. Washing, cleaning, wringing, rinsing, domestic grinding, hairdressing, juice extracting and mixing machines, and parts of all such machines not included in other classes.—R. N. Fitton, Ltd., Radio Works, Hutchinson Lane, Brighouse, Yorks.

GOWSHALL (design). No. B646,729, Class 9. Luminous and mechanical traffic signs, and road traffic signals and indicators, and parts included in Class 9 of all such goods, etc. B646,730, Class 11. Lamps and lighting arrangements for roadways, and parts included in Class 11 of all such goods.—Gowshall, Ltd., 92, Rocky Lane, Aston, Birmingham, 6.

PIXIE. No. 653,831, Class 9. Complete portable vacuum-cleaning machines and complete vacuum dust-extracting apparatus.—British Vacuum Cleaner & Engineering Co., Ltd., Goblin Works, Ermyn Way, Leatherhead.

NEORA. No. B657,150. Electric fluorescent lighting fittings and parts thereof included in Class 11.—Neon Rentals, Ltd., 168, Victoria Street, London, S.W.1.

Design. No. 661,996, Class 11. Heating and cooling installations and parts thereof included in Class 11.—Richard Crittall Stralingswarmte, Ltd., 156, Great Portland Street, London, W.1.

Pageant of the Lamp

AS a memorial to the two pioneers whose names are included in the style of the company, the Edison Swan Electric Co., Ltd., has compiled a well-written book of 72 pages entitled "The Pageant of the Lamp." The production with its 33 illustrations reaches a standard that is uncommon in these post-war days.

The rival claims of Swan and Edison to be the inventor of the incandescent electric lamp are objectively assessed. Swan exhibited his lamp on 18th December, 1878, but regarded the principles as unpatentable. Edison, however, who had evolved a different kind of lamp, was granted a British patent about eleven months later and this covered Swan's lamp. It was Swan who had worked out the means of preparing carbon strips and also of evacuating the bulb by making the filament incandescent during exhaustion for which he obtained a patent in 1880. Shortly afterwards he secured a further patent for the cellulosed thread filament which eventually became the standard for all commercial lamps. Fortunately the two inventors took the sensible course of avoiding litigation and merged their resources. The book also gives some historical particulars of earlier electric lighting and the means of supplying electricity for it.

STOCKS AND SHARES

STOCK Exchange markets have now started upon the real holiday season of the year. This in itself would be normally regarded as a sufficient reason for a falling away of business. In addition there is, of course, the continued uneasiness produced by the Continental complexities. Abundance of money is still a feature of the present investment position, but the best method for its employment is hard to determine, and, being in doubt, capital prefers to keep out of Stock Exchange markets for the time being.

"Safety-First" Securities

Money steadily absorbs the "safety-first" stocks, of which British Electricity "threes" are now established as a popular favourite; the price, 100½, is the best touched since dealings started. British Transport "threes" follow the upward trend, but the longer date, 1978-1988, as compared with Electricity 1968-1973, gives the latter a preference which some people think is reflected in the price of 97⅞. The industrial groups are a little firmer, after the sharp falls which took place towards the latter part of July.

The Month's Price Changes

Holders of stocks and shares will derive but cold comfort from the study of price movements that occurred during July. By comparison with the end-June levels, fairly heavy falls have occurred in a number of directions. Cable stocks, ordinary and preference, have weakened, and British Electric Traction deferred shows a drop of 90 points at 1635; during the month, it went down to 1560. Thomas Tilling have been a lively market, falling at one time from 103s. to 95s. but recovering to 97s. 6d.

Anglo-American Recovery

The best showing is made by Anglo-American Telegraph stocks, the preferred and deferred being respectively 8 and 7 points higher, on the result of the recent lawsuit that, unless the judgment is reversed upon a possible appeal, should enable a restart to be made shortly with dividend payments on the stocks. Amongst the shares in the equipment and manufacturing group, falls range from 6d. to 7s. 6d., the latter drop having occurred in Hopkinsons at 95s.

Decca and E.M.I. Finances

Financial requirements of Decca are being raised by an issue of new ordinary shares; those of E.M.I. by a placing of 4 per cent ten year notes. Decca shareholders are not being given the opportunity to subscribe the fresh capital. This is being raised by acceptance of an offer from Securities Agency of 17s. 6d. a share for half a million 1s. shares. The directors, who are interested in more than one-third of the existing ordinary capital, explain that they would not be justified in refusing the offer in the present unsettled state of affairs: the market price for the old shares is 1s. down on the month at 19s. E.M.I. 10s. shares remained a dull market at 16s. 6d.

Vactric

A minor feature of interest in the last few days was a rise of a florin to 8s. 3d. in the shares of Vactric, Ltd., followed by a subsequent reaction to 6s. 3d. It is officially announced that negotiations with the Treasury have been going on for some time, and have resulted in the Treasury's consenting to grant a loan to the company not exceeding £500,000 at 4 per cent interest, and repayable within five years. The company's bankers are going to permit an overdraft up to £250,000. Stringent conditions have been laid down as a part of the agreement. The company cannot pay a dividend on its ordinary shares without the Treasury's consent in writing. However, the plan, if it is accepted by the shareholders, will give the company a fresh lease of life in providing capital for more stocks, equipment and factory space.

Metal Industries Group

Market interest in the latest annual results of Electrical Switchgear and Associated Manufacturers resides in the shares of Metal Industries. This company holds all the ordinary capital of Electrical Switchgear, whose subsidiary, Brookhirst Switchgear, has produced an increase in profits from £4,000 to £181,000. Profits of the Metal Industries group, according to the preliminary statement, were practically doubled during the year ended last March, to a total of £809,000. No tangible benefits pass to shareholders, who again receive 10 per cent for the year. At 43s. 9d. the "B" shares yield a few pence over 4½ per cent. The company's holding of £925,000 British Oxygen ordinary stock, standing in the books at a figure of £2,525,000, has a market value to-day of about £4,400,000.

Scottish Cables

Dealings began last week, as the result of a market introduction, in the issued capital of Scottish Cables, consisting of £200,000 in 4½ per cent preference shares and £250,000 in ordinary stock. The former are quoted at 23s. 6d. to yield £3 16s. 6d. per cent, and the ordinary, in 4s. units, are 24s.; both issues are subject to stamp duty. Profits have made big strides since the incorporation of the company two years before the war. They reached record figures for the year ended last April. On those results, earnings cover the preference dividend sixteen times and represent about 52 per cent on the ordinary. The ordinary dividend of 30 per cent, recommended for the past year, would show a yield of 5 per cent, comparing well with others in the cables field. Dealings have begun with the units quoted ex dividend. Sterling Cables 4½ per cent preference shares, another recent introduction, stand at 20s. 3d.

ELECTRICAL INVESTMENTS

Past Month's Price Changes

Company	Dividend Previous	Dividend Last	Middle Price 30 July 1948	Month's Rise or Fall	Yield p.c.
Overseas Electricity Companies			£ s. d.		
Atlas Elec. ..	Nil	2	14/-	−6d.	2 17 2
Calcutta Elec. ..	6†	6†	37/-	−1/9	3 4 10
Cawnpore Elec...	13	13	45/6	−4/6	5 14 6
EastAfricanPower	7	7	43/6	..	3 4 3
Jerusalem Elec..	5	6	21/-	−6d.	5 14 3
Madras Elec. ..	8	5	35/-	−5/-	2 17 2
Nigerian Elec. ..	12½	10	34/-	−2/3	5 17 8
PalestineElec."A"	7†	7†	32/6	−2/6	4 6 2
Perak Hydro-elec.	Nil	Nil	13/-	−2/-	—
Tokyo Elec. 6% .	—	—	41½	−6	—
VictoriaFallsPower	19½	19½	7½	−8/9	—
WhitehallInv.Pref.	—	6	25/6	..	4 14 1
Equipment and Manufacturing					
Aron Elec. Ord...	15	15	47/6	−5/-	6 6 0
Assoc. Brit. Eng.	12	12	40/-	−2/6	6 0 0
Assoc.Elec.Ord...	15	15	71/3	−3/9	4 4 3
AutomaticTel.&El.	12½	12½	63/9	..	3 18 7
Babcock & Wilcox	15	15	65/9	−1/-	4 11 6
Baldwin,H.J.(2/-)	25	25	9/6	..	5 5 0
British Aluminium	10	10	47/3	−1/6	4 4 9
B.I. Callender's..	6¾	6¾	33/-	−1/-	4 0 2
British Rola (2/-)	15	10	1/-	..	—
BritishThermostat (5/-)	23½	23½	25/9	..	4 11 3
BritishVac.Cleaner (5/-)	20	20	13/-	−6d.	7 13 10
Brush Ord.(5/-)..	—	—	6/-	−3d.	—
Burco (5/-) ..	35	35	22/9	..	7 7 4
ChlorideEl.Storage	20	20	95/-	−2/6	4 4 2
Cole, E. K.(5/-)..	20	22½	12/6	−2/-	9 0 0
Cossor, A. C. (5/-)	25	Nil	8/6	+6d.	—
Crabtree (10/-)..	17½	17½	41/3	−9d.	4 4 9
CromptonParkinson Ord. (5/-) ..	22½	22½	24/-	−1/-	4 13 9
De La Rue (5/-)	50	50	39/6	−2/6	6 6 7
Decca (1/-) ..	112½	112½	19/-	−1/-	5 18 5
E.M.I. (10/-) ..	8	6	16/6	−9d.	3 12 9
Elec. Construction	12½	12½	48/9	..	5 2 6
Enfield Cable Ord.	7½	7½	32/6	..	4 12 3
English Electric .	10	10	45/-	−3/3	4 8 6
Ericsson Tel. (5/-)	20†	20†	43/3	−2/6	2 6 4
Ever Ready (5/-)	40	40	36/6	−1/-	5 9 7
Falk Stadelmann	10	15	42/6	−3/9	7 1 2
Ferranti Pref. ..	7	7	35/-	..	4 0 0
G.E.C. Ord. ..	17½	17½	31/3	−3/9	4 6 2
GeneralCables(5/-)	25	50	37/6	..	6 13 4
Greenwood&Batley	15	15	52/-	−⅛	5 15 5
H.T.A. (10/-) ..	10	10	13/9	−2/6	7 5 6
Heatrae (2/-) ..	12½	12½	5/-	..	5 0 0
Henley's (5/-) ..	20	20	23/6	−1/6	4 5 1
Hopkinsons ..	22½	22½	95/-	−¾	4 14 6
Intl. Combustion (5/-)	37½	37½	40/-	−⅛	4 14 9
Johnson & Phillips	15	15	66/-	−3/-	4 11 0
LancashireDynamo	22½	22½	97/6	−2/6	4 12 3
Laurence,Scott(5/-)	12½	12½	13/6	..	4 12 7
London Elec.Wire	10	10	45/-	−⅛	4 9 0
Mather & Platt ..	11	11	50/9	−⅛	4 6 8
Metal Industries(B)	10	10	43/9	−⅛	4 11 4
Mid. Elec. Mfg...	35	35	8½	−½	4 5 0
Murex	20	20	86/3	..	4 13 0
Newman Ind.(2/-)	22½	22½	7/-	..	6 8 7
Plessey (5/-) ..	30	20	15/-	..	6 13 4
Parsons C. A. ..	12½	12½	60/-	−⅝	4 3 4
Pye Deferred (5/-)	25	25	20/-	..	6 5 0
Radio & Tel. (2/-)	40	—	4/6	−6d.	—
Revo (10/-) ..	27½	27½	58/-	−1/6	4 14 9
Reyrolle ..	12½	12½	60/-	−⅛	4 3 4
Scophony (5/-) ..	—	—	2/-	−3d.	—
Siemens Ord. ..	7½	7½	32/-	−1/-	4 13 9
Strand Elec. (5/-)	12½	17½	9/6	−1/-	9 4 2
Switchgear&Cowans (5/-) ..	10	20	16/6	−6d.	6 1 3
T.C.C. (10/-) ..	15	15	32/6	−5/-	4 12 4
T.C. & M. ..	10	10	45/-	−3/-	4 9 0
Telephone Mfg.(5/-)	9	9	9/3	−9d.	4 17 3
Thorn Elec. (5/-)	20	25	18/9	..	5 6 8
Tube Investments	22½	25	6	−⅛	4 3 4
Vactric (5/-) ..	Nil	Nil	6/3	..	—
Veritys (5/-) ..	2½	5	4/-	..	6 5 0
WalsallConduits(4/-)	70	70	54/3	−2/-	5 2 9
Ward & Goldstone (5/-)	50	50	57/6	−⅛	4 6 10
Watford (2/-) ..	15	15	5/3	−1/-	5 14 3
WestinghouseBrake	14	14	62/6	−3/-	4 9 7
West, Allen (5/-)	10	10	9/9	−6d.	5 2 7
Transport and Communications					
Anglo-Am. Tel.: Pref.	6	6*	125	+8	—
Def.	1½	1½*	25	+7	—
Anglo-Portuguese	8	8	31/6	−6d.	5 1 7
Brit.Elec.Traction: Def. Ord. ..	50	50	1635	−90	3 1 4
Calcutta Trams..	10	Nil	29/6	−1/-	—
Cape Elec. Trams	6	6	32/6	−⅛	3 13 10
Cable & Wireless: 5½ Pref. ..	5½	5½	122½	−4	4 9 6
Ord.	4	4	185½	−5	2 3 0
CanadianMarconi$1	Nil	4 cts.	12/6	+½	—
Globe Tel. & Tel.Ord.	5†	5†	42/6	−½	2 7 0
GreatNorthernTel. (£10)	15	12	22	−2	5 9 2
Inter. Tel. & Tel.	Nil	Nil	24	−2	—
Marconi-Marine..	7½	7½	32/-	−1/9	4 13 9
Oriental Tel. Ord.	4	10	45/-	−⅛	4 9 0
Telephone Props.	6	6	18/9	..	6 8 0
Tele. Rentals(5/-)	10	10	10/9	−9d.	4 13 0
T. Tilling ..	10	10	96/6	−6/-	2 1 6

* Dividend postponed.

† Dividends are paid free of Income Tax.

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FUSES
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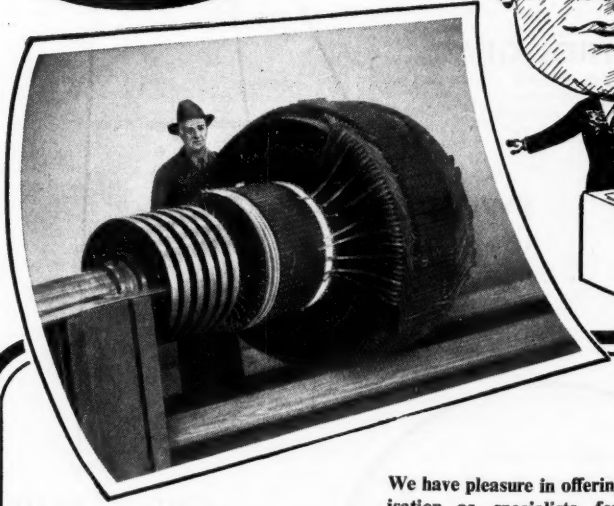

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NEW BOOKS

Data on Plastics. Properties of Klystrons.

Plastics for Electrical and Radio Engineers. By Tucker and Roberts. Pp. 167; figs. 28; index. The Technical Press, Ltd., Gloucester Road, Kingston Hill, Surrey. Price 15s.

This is a practical man's handbook, written by specialists in plastics for specialists in radio. The object is "to provide the electronic engineer with essential data relating to the application of plastics in the electrical and radio industries." It is a second edition, incorporating some new matter released since the war and some that has been published by the authors in the technical press.

The book follows the accepted conventions for such handbooks, beginning with a group of chapters on the chemistry of plastics, available types, properties and tests. Then follows a second group on the problems of design and production. Finally there are two chapters on (i) plastics used as protective coatings and (ii) in relation to electrical conductors.

There is something to be said for the all-embracing treatment of a subject when the intention is to give a detached view, as in a school textbook, for example; but it militates against the main purpose of a handbook for specialists. The qualified electrical and radio engineer does not expect to get his ideas on the mechanism of insulation failure, under electric stress, from a practical handbook purporting to tell him how to apply the most recent advances in plastics technology to, say, the design of a transformer.

Many workers in plastics are completely unaware that, thirty years ago, their craft was little more than an offshoot of the electrical industry. Under the stimulus of two wars, the creative workers in other industries have made fantastic demands upon the plastics industry. The reaction has been most creditable. What is wanted now is not a retrospective survey of what was thus achieved, but some indication as to how the advances that stand to the credit of the plastics industry can be applied to the problems of the future.

We invite the authors to consider a third edition in which extrapolation is substituted for interpolation.—W.D.O.

Diary and Sundry Observations of Thomas Alva Edison. By Dagobert D. Runes. Pp. 247. illus. and index. Philosophical Library, Inc., 15 East 40th Street, New York, 16. Price 28s. 6d.

This book provides the reader with an extremely well-chosen collection of extracts from the various writings of the inventor. The diary, which forms the first of two main sections, is presented here for the first time in book form. Like the many chapters of his observations and notes, it is only fragmentary and far from complete. This, however, does not detract from its value, as a clear conception of Edison's personality is conveyed to the reader.

It will be found that many of his casual remarks made decades ago have a definite contemporary significance, the propositions in ethics, philosophy and education showing a rare combination of whimsy and deep sincerity. —A.R.P.

The Graduate in Industry. By P. Dunsheath, M.A., D.SC. Pp. 276; index. Hutchinson's Scientific & Technical Publications, 47, Princes Gate, London, S.W.7. Price 10s. 6d.

While this is not a "careers" book, it gives a clear picture of the trend of events in the industrial field which concern and should stimulate the interest of all students and graduates. It is also likely that those who are responsible for the guiding of young people into employment will find much helpful material therein. In writing this book, the author has made the first attempt ever to discuss on a broad basis the relationship between the universities and industry, outlining the opportunities for graduates in all kinds of industrial employment.—A.R.P.

Klystron Tubes. By A. E. Harrison. Pp. 271; figs. and index. McGraw-Hill Publishing Co., Ltd. Price in U.K. 21s.

The author was a member of the team working on klystron development with the Sperry Gyroscope Co. during the war and he is well qualified to write authoritatively on the subject. Although this book refers solely to the American development of these valves, and the British effort can by no means be ignored, nevertheless Prof. Harrison's treatment is applicable to klystrons of all types.

There is no doubt that the low power reflection klystron is the type which has found the greatest practical application, in radar receiving and measuring apparatus, and this is the type most covered from the practical aspect in this book, the body of which deals with the theory of the valve and its resultant characteristics. The theoretical treatment is very thorough: an understanding of elementary calculus and standard algebraic methods is required. The mathematical treatment indicates the nature of the results which are to be expected and the method of analysing them is stated. In addition the book describes very fully the graphical methods of representing the valve characteristics.

The author has included several chapters on associated apparatus, apparently related to the practical applications of the valve. It would have been better if some of this material had been omitted from the book and the remainder retained solely to describe valve measurements.

The chapter on cavity resonators would not be given a second glance by anyone experienced in the subject. The treatment is forced and scanty. The chapter on power supplies is a guide to the principles employed in electronic stabilized power units, but it does not represent fully the most advanced techniques.

Microwave techniques and measurements are a vast subject. Prof. Harrison's single chapter thereon is a brief descriptive piece which makes no real contribution to the understanding of klystrons or their uses. One wonders why he included it instead of relying upon a reference to some authoritative work on the subject. A large number of references are given in Appendix C, but there is no guide to their relevance and they are not related to the text.

For the knowledgeable reader, the book is a very good review of the properties of klystrons and it will make a marked contribution towards his understanding of their operation, but an understanding of electronic technique is required before reading the book. It will also form a very good introduction for the beginner who intends working on, or with, these valves. — L.W.B.

Canadian Electrical Imports

SUBSTANTIAL INCREASE IN 1947

ACCORDING to preliminary figures just issued in Ottawa, imports of electrical goods into Canada last year were valued at $68,773,000 compared with $47,788,000 in 1946. They were three and a half times the value of exports of such goods. The main groups with totals for 1947 and notes of increase or decrease on 1946 are shown in the accompanying statement. It will be seen that the only noteworthy decline was in primary batteries. Britain maintained her position but compared with the United States it remained poor. Czechoslovakia, Italy and France reappeared as suppliers.

Class of Equipment and Supplying Countries	1947 $(000)	Inc. or dec. on 1946 $ (000)
Batteries, primary	295*	− 350
Batteries, storage	677	+ 34
From United Kingdom	29	− 7
„ *United States*	648	+ 42
Heating apparatus	1,298	+ 521
From United Kingdom	23	+ 15
„ *United States*	1,275	+ 507
Dynamos and parts	3,068	+ 727
From United Kingdom	268	+ 61
„ *United States*	2,750	+ 737
„ *Switzerland*	14	− 79
„ *Australia*	20	+ 7
Lamps, carbon filament	3*	+ 2
Lamps, metal filament	729*	+ 131
Lamps, arc	202*	+ 57
Torches, flashlights, side and tail lights	1,525	− 18
From United Kingdom	58	+ 27
„ *United States*	1,438	− 52
Lighting fixtures and appliances	4,709	+ 1,436
From United Kingdom	36	+ 23
„ *United States*	4,522	+ 1,289
„ *Czechoslovakia*	58	+ 49
„ *Italy*	87	+ 74
Electric meters	746	+ 164
From United Kingdom	50	+ 16
„ *United States*	696	+ 147
Motors valued at less than $10	272*	+ 115
Motors, other and complete parts	7,096	+ 2,633
From United Kingdom	590	+ 125
„ *United States*	6,483	+ 2,499
„ *Sweden*	19	+ 8
„ *Switzerland*	3	—
Rheostats, controllers, etc.	3,694	+ 511
From United Kingdom	62	+ 36
„ *United States*	3,612	+ 470
„ *Switzerland*	19	+ 4
Self-contained lighting outfits	325*	− 94
Electric irons	527	+ 241
From United Kingdom	98	+ 82
„ *United States*	429	+ 159
Sockets, outlets, etc.	604*	+ 275
Magnetos and parts for i.c. engine manufacturers	75*	+ 20
Spark plugs, magnetos, etc.	134	+ 58
From United Kingdom	10	+ 7
„ *United States*	124	+ 51
Flameproof switchgear for use underground in coal mines—all from United Kingdom	31	+ 21
Switches, switchboards and circuit breakers	4,484	+ 2,274
From United Kingdom	283	+ 191
„ *United States*	4,190	+ 2,097
„ *Switzerland*	11	− 14
Telegraph apparatus	738	+ 117
From United Kingdom	67	+ 13
„ *United States*	671	+ 103
Radio receiving sets	2,214*	+ 1,411
Radio set parts	2,576*	+ 99
Radio valve parts	512*	− 132
Other radio apparatus, n.o.p.	6,908	+ 1,196
From United Kingdom	392	+ 77
„ *United States*	6,486	+ 1,102
„ *France*	26	+ 26
Radio valves	1,202*	+ 37
Refrigerators	5,996	+ 4,714
Telephone apparatus	7,053	+ 3,563
From United Kingdom	627	+ 454
„ *United States*	6,426	+ 3,110
Transformers and complete parts	1,202	+ 561
From United Kingdom	199	+ 85
„ *United States*	956	+ 430
„ *Switzerland*	47	+ 47
Electric steam generators and parts of a kind not made in Canada	1,621	+ 1,074
From United Kingdom	501	+ 203
„ *United States*	916	+ 741
„ *Switzerland*	203	+ 203
Electric dry shavers	1,093	+ 596
From United States	1,043	+ 548
„ *Switzerland*	50	+ 50
Electrical precision instruments	1,299	—
From United Kingdom	88	—
„ *United States*	1,210	—
Electrical apparatus, n.o.p.	7,775	+ 2,056
From United Kingdom	272	+ 101
„ *United States*	7,498	+ 1,955
„ *Switzerland*	5	+ 1

*All or nearly all from U.S.A.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1939

W. W. GROVES (Aktieselskabet Elektrisk Bureau).—"Modulating system for carrier wave signalling." 32602. 20th December, 1939. (605184.)

1943

British Thomson-Houston Co., Ltd.—"Processes and dies for extruding tubular products." 17623. 30th October, 1942. (604905.)

Telefonaktiebolaget L. M. Ericsson.—"Single-phase synchronous motors." 21060. 16th December, 1942. (604906.)

1944

Purves Corporation.—"Apparatus sensitive to magnetic fields." 4689. 17th September, 1942. (604907.)

F. Lambach and W. Siegel.—"Electrically operated stop motion for a warping or beaming plant." 7385. 1st February, 1944. (605185.)

Communications Patents, Ltd., and E. W. Rogers.—"Telephone receivers." 7862. 27th April, 1944. (604908.)

Philips Balham Works, Ltd., and C. E. G. Bailey.—"Radio-navigational aids." 22762. 16th November, 1944. (605048.)

Sperry Gyroscope Co., Inc.—"Electrical servo or follow-up systems." 23380. 19th July, 1943. (604914.)

Standard Telephones & Cables, Ltd.—"Electrical signalling." 24603. 24th February, 1944. (605049.)

1945

Teletype Corporation.—"Telegraphic apparatus." 1196. 20th December, 1943. (604917.)

Standard Telephones & Cables, Ltd.—"Radio signalling systems particularly for radio beacons." 5512. 12th June, 1943. (604920.)

Philco Radio & Television Corporation.—"Latch mechanism." 6679. 29th September, 1944. (605051.)

Soc. Anon A. Citroen.—"Combined radio and audible warning device." 8238. 15th February, 1944. (604923.)

Standard Telephones & Cables, Ltd.—"Radio direction indicating systems." 10043. 26th April 1944. (604925.)

F. C. Williams.—"Wireless signalling systems." 13064. 24th May, 1945. (605053.)

Philco Radio & Television Corporation.—"Refrigeration apparatus." 13562. 30th May, 1944. (605192.)

H. S. Cockcroft.—"Aerial arrangements for the reception of electromagnetic waves." 13924. 2nd June, 1945. (604928.)

K. Gloor.—"Extrusion press for the covering or coating of electrode rods." 17824. 12th July, 1945. (605056.)

Sperry Gyroscope Co., Inc.—"Attenuating apparatus for high-frequency electro-magnetic energy." 19836. 2nd August, 1944. (605198.)

Liquidometer Corporation.—"Electrical control and indicating devices." 20274. 11th December, 1944. (604933.)

Western Electric Co. Inc.—"Electrical signalling systems." 21017. 17th August, 1944. (604936.)

Philco Corporation.—"Electric wave-generating systems." 22350. 30th August, 1944. (604939.)

Pye, Ltd., and D. Weighton.—"Arrangement for suppressing impulsive interference in the reception of amplitude modulated signals." 28011. 24th October, 1945. (605206.)

Standard Telephones & Cables, Ltd., and S. S. Hill.—"Sound recording." 28359. 26th October, 1945. (605060.)

Metropolitan-Vickers Electrical Co., Ltd., and A. G. Ellis.—"Heat radiators." 30337. 13th November, 1945. (605061.)

Aron Electricity Meter, Ltd., and E. J. Riordan.—"Electrical instruments." 31191. 20th November, 1945. (604949.)

British Thomson-Houston Co., Ltd., and T. X. Lewis.—"Means for obtaining a variable direct voltage from a source of constant direct voltage particularly suitable for electric traction control." 31222. 20th November, 1945. (605062.)

General Electric Co., Ltd., and F. Warhurst.—"Illuminated diagrams for instructional and like purposes." 31580. 23rd November, 1945. (Cognate application 30092/46).) (604984.)

Ribet & Desjardins.—"Wide band thermionic valve amplifiers." 32303. 14th June, 1945. (605064.)

Power Jets (Research & Development), Ltd., and J. F. Alcock.—"Electrical temperature control and indicator systems." 32689. 3rd December, 1945. (605065.)

W. T. Henley's Telegraph Works Co., Ltd., and W. F. E. Smith.—"Plant for wire drawing." 33229. 8th December, 1945. (605070.)

British Thomson-Houston Co., Ltd.—"Cabinet shelves." 33346. 13th December, 1944. (604952.)

Chloride Electrical Storage Co., Ltd. (J. C. Duddy).—"Micro-porous diaphragms or separators for use in electric accumulators." 33366. 10th December, 1945. (604957.)

Varley Dry Accumulators, Ltd., H. D. Lark and J. A. Szper.—"Electric secondary batteries." 33390. 10th December, 1945. (Cognate application 6727/46.) (604960.)

British Thomson-Houston Co., Ltd.—"Electric-discharge devices of the magnetron type." 33393. 11th December, 1944. (604961.)

Standard Telephones & Cables, Ltd.—"High-frequency amplifier." 33462. 2nd April, 1945. (604988.)

Siemens Bros. & Co., Ltd., and J. Price.—"Selecting switches such as are used in automatic telephone systems." 33477. 11th December, 1945. (604992.)

Metropolitan-Vickers Electrical Co., Ltd., and N. Ryder.—"Electric measuring instruments and relays." 33509. 11th December, 1945. (604978.)

Metropolitan-Vickers Electrical Co., Ltd., and N. Ryder.—"Electric measuring instruments and relays." 33510. 11th December, 1945. (604979.)

Metropolitan-Vickers Electrical Co., Ltd., and M. B. Coyle.—"Power plant." 33513. 11th December, 1945. (605004.)

Automatic Telephone & Electric Co., Ltd., and T. P. Preist.—"Electrical alarm signalling systems." 33572. 12th December, 1945. (605015.)

Elexcel, Ltd., and E. Barrie.—"Electric smoothing irons." 33573. 12th December, 1945. (605016.)

Telegraph Condenser Co., Ltd., and W. F. Taylor.—"Electrolytic capacitors." 33758. 13th December, 1945. (605077.)

English Electric Co., Ltd., and E. G. Sterland.—"Gas turbine plant." 33781. 13th December, 1945. (Cognate application 1298/46.) (605080.)

English Electric Co., Ltd., and E. G. Sterland.—"Gas turbine plant." 33782. 13th December, 1945. (605081.)

Standard Telephones & Cables, Ltd.—"Television receiving systems." 33906. 25th August, 1944. (605109.)

General Electric Co., Ltd., H. C. Turner and G. W. Hartland.—"Toroidal inductance coils." 33907. 14th December, 1945. (605114.)

Akt.-Ges. fur Technische Studien.—"Gas turbine power plants." 33914. 29th December, 1944. (605116.)

Philips Lamps, Ltd.—"Beam-deflecting circuits for cathode-ray tubes." 33930. 3rd October, 1946. (605120.) "Electrical devices for use in checking the equality of two frequencies." 33931. 17th September, 1940. (605121.) "Projectors for the image of a cathode-ray tube." 33932. 30th September, 1940. (605122.)

British Thomson-Houston Co., Ltd.—"Arc-chute housings for electric circuit-breakers." 33937. 20th December, 1944. (605123.) "Electric air circuit-breakers." 33938. 20th December, 1944. (605124.)

M. Andersen.—"Insulator for electric fences and nails for its attachment." 33940. 22nd May, 1944. (605125.)

Patelhold Patentverwertungs- & Elektro-Holding, Akt-Ges.—"Multiple signal transmission systems." 33956. 23rd December, 1944. (605128.)

Siemens Bros. & Co., Ltd., and D. P. Long.—"Telephone and like selective systems." 33966. 14th December, 1945. (605131.)

British Thomson-Houston Co., Ltd.—"Coil supports for electromagnetic induction apparatus." 33980. 22nd December, 1944. (605138.)

E. K. Cole, Ltd., J. J. P. Hanaway and W. De Boo.—"Socket for a starting switch for a fluorescent lamp." 33994. 15th December, 1945. (605144.)

Ericsson Telephones, Ltd., and D. C. Crowe.—"Automatic telephone or like selectors." 34062. 17th December, 1945. (605152.)

A. Reyrolle & Co., Ltd., A. Allan and N. R. Blanch.—"Gas-blast electric circuit-breakers." 34098. 17th December, 1945. (605163.)

Westinghouse Electric International Co.—"Electric resistance welding systems." 34111. 15th August, 1944. (605168.)

British Thomson-Houston Co., Ltd.—"Electric push-button switch assemblies." 34125. 22nd December, 1944. (605170.)

Marconi's Wireless Telegraph Co., Ltd.—"Pulse-communication systems." 34177. 8th January, 1944. (605178.)

W. Johnsen, Aktieselskabet.—"Device for transforming direct current into alternating current or vice versa." 34200. 18th February, 1944. (605181.)

Automatic Telephone & Electric Co., Ltd., and E. Frydman.—"Electromagnetic relays." 34209. 18th December, 1945. (605183.)

A. Reyrolle & Co., Ltd., and D. F. Amer.—"Gas-blast electric circuit-breakers." 34216. 18th December, 1945. (605217.)

British Thomson-Houston Co., Ltd.—"Silicone resin compositions." 34220. 23rd December, 1944. (605218.)

C. J. Armstrong and J. E. G. Noad.—"Electrical snap-action switches." 34345. 18th December, 1945. (605246.)

R. G. Boardman and A. P. Thomas.—"Electric steaming irons." 34362. 19th December, 1945. (Cognate application 6910/46.) (605247.)

Sperry Gyroscope Co., Inc.—"Concentric conductor transmission lines." 34771. 21st December, 1944. (605253.)

W. Jessop & Sons, Ltd., and D. A. Oliver.—"Methods of manufacturing permanent magnets of the kind employed in electric metering apparatus." 35018. 28th December, 1945. (605113.)

Machine-Tool Control

Servo-Electronic System

THE erection of a new Loudon planer at its Witton engineering works provided the General Electric Co., Ltd., with the opportunity of equipping the machine with a servo-electronic system of power conversion and control. The system was designed on comprehensive lines and can be applied to any equipment which demands rapid and precisely controlled reversals, together with continuously variable speed adjustment.

The table of the planer measures 5 ft by 14 ft (1·524 m by 4·27 m), the main d.c. driving motor being rated at 9/50/50 h.p. at 69/400/620 r.p.m. It has been specially designed for reversing duty, having both radial brushgear and laminated interpoles. The feed motor is conventional with a short-time rating of 7 h.p. Power for the table and feed motor armatures is supplied by a 6-phase grid-controlled pumpless steel tank mercury arc rectifier. The main anodes are used to supply the table motor, and two auxiliaries, which are not grid controlled, to supply the feed motor.

The six main anodes are regulated by a static phase-controlling network and servo-amplifier, the input references of which are regulated by four potentiometers on the control desk. Arrangements are such that the speed of the table in either direction may be pre-set independently. The amplifier also provides an overriding current servo-control to limit the maximum current in the motor armature, which is under the control of the operator over a restricted range so that overloads beyond the pre-set value are impossible.

Reversal of the table is effected by reversing the contactors in the motor armature circuit. During this part of the cycle, when the tool is lifted clear of the work by a solenoid, the current is constant and limited to the maximum value pre-set by the operator, while the energy stored in the moving masses is returned to the mains, the rectifier functioning as an invertor. The table can be additionally accelerated to a high speed between cuts in cases where widely separated surfaces are being machined.

The number of revolutions made by the feed motor in one cycle of operation is automatically counted and can be pre-set by means of a stud switch on the control desk, thus pre-setting the feed travel of the tool holder. A two-speed gear box is incorporated in the drive from the feed motor to the tool holders, giving feed ranges of from 1/64 to 3/16 in. on fine gear and 1/8 to 1½ in. on coarse gear, each having ten steps.

The setting-up of the machine is done from the control desk and the operating controls, which comprise two push-button pendants, are situated one on each side of the machine. By comparison with the more usual Ward-Leonard system, this particular type of control affords a number of important advantages. The rectifier conversion efficiency is higher, being most marked at medium and low loads, which results in a considerable saving of energy. Due to the maximum current limit, the torque of the table motor during reversal and acceleration remains substantially constant instead of being "peaked." This has the effect of minimizing both the electrical and mechanical stresses on the equipment.

All controls, including the feed selection, may be operated while the table is in motion and no injury can be caused by too rapid manipulation of the speed controls.

Export Inquiries

WE have received the undermentioned inquiries from firms and individuals overseas who wish to secure agencies for British electrical equipment and appliances or to import them into their territories. We shall be glad to pass on to them replies received from readers, which should be addressed to the Editors, quoting the number given in parentheses. We cannot vouch for the standing of inquirers and manufacturers replying to them will no doubt require the usual references:—

British Guiana.—A firm with head office at Georgetown wishes to secure sole distributors' agencies for electrical goods of all kinds, including wires and cables, cookers, insulating materials and domestic appliance. (X. 200).

CONTRACT INFORMATION

ACCEPTED TENDERS AND PROSPECTIVE ELECTRICAL WORK

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Australia.—MELBOURNE.—14th September. Director of Posts and Telegraphs. Accumulator cells. Particulars from the office of the High Commissioner for Australia, Australia House, Strand, W.C.2.

South Africa.—DURBAN.—8th October. City Electricity Department. Two 6,600-V duplicate busbar switch panels for Berea Park substation. (Ref. 38490/48).*

Stoke-on-Trent.—12th August. Corporation. Electric lamps for six months ending 31st March, 1949; city surveyor, Town Hall.

Uruguay. — MONTEVIDEO. — 6th September. Usinas Electricas y Telefonos del Estado. Three motor generator sets, with option up to six sets. (Ref. E.P.D. 38711/48).*

* Specifications may be inspected at the Export Promotion Department, Thames House North, Millbank, S.W.1.

Orders Placed

Bridgnorth.—Town Council. Electrical installations in 57 houses (£1,038).—Frank Smith (Electrical), Ltd.

Newcastle-on-Tyne.—City Council. Accepted. 200-kVA transformer for the Dyker Depot (£314).—C. A. Parsons & Co.

South Shields.—Corporation. Accepted. Four trolley-bus chassis (£2,088 each).—Sunbeam. Four trolley-bus bodies (£2,325 each).—Northern Coachbuilders.

Education Committee. Accepted. Rewiring Baring Street School (£1,006).—T. Sloan.

Tynemouth.—Town Council. Accepted. Switchboard for Linskill Secondary School (£110).—Dorman & Smith. Switchboard for the Ralph Gardner Secondary Modern School (£155).—G. P. Dennis.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Acton.—Factory, Brunel Road; Cyc-Auto Works, Ltd., 381, Uxbridge Road.

Block of 18 flats, Oakley Avenue, for Borough Council; C. E. Culpin, architect, 3, Southampton Row, W.C.1.

Antrim.—Additions and alterations to Masserene Hospital; W. D. R. and R. T. Taggart, architects, 36-38, Castle Arcade Buildings, Belfast.

Aycliffe (Co. Durham).—Aluminium houses (41) for the Aycliffe Development Corporation; W. Townson & Son, builders, Bolton, Lancs.

Barking.—Four three-storey blocks of flats, Mayesbrook Park estate; C. C. Shaw, borough architect.

Barnsley.—Houses (50), Athersley estate; borough engineer.

Bath.—Workshops and offices, Circus Mews; H. Sheppard & Sons, builders, 24, Circus Place.

Belfast.—Houses (100), Highfield estate; Architect's Department, Room 15, Floor E, College of Technology.

Billingham-on-Tees.—Houses for the U.D.C. Builders: H. A. Dawson (Estates), Ltd., Billingham (22); J. H. Proudlock, Middlesbrough (18); and Isley & Nicholson, Billingham (10).

Blackpool.—Three-storey factory; Lawrence & Hilton, Ltd., 481, Waterloo Road, South Shore.

Bridge-Blean.—Houses (40), Barham site, for R.D.C.; surveyor, 41, Old Dover Road, Canterbury.

Burnley.—Factory and offices, White Street; Harling & Todd, Ltd., Rosegrove Works.

Caerphilly.—Houses (70), Nantgarw No. 2 estate; surveyor, Urban Council Offices.

Carlisle.—Houses (124) at Upperby and Harraby, and 50 "Easiform" houses; P. Dalton, city engineer, 18, Fisher Street.

Castle Bromwich.—School (£120,382); county architect, Shire Hall, Warwick.

Chapel-en-le-Frith.—Houses (40) for R.D.C.; Pendleton & Dickinson, architects, 16, Brazennose Street, Manchester, 2.

Coventry.—Secondary school, Keresley Road and Brownshill Green Road; D. E. E. Gibson, city architect, 1a, Warwick Row.

Cradley Heath.—Works extension, for Samuel Woodhouse & Sons, Eagle Chain Works; Robinson & Kay, architects, Victoria Chambers, Stourbridge.

Croydon.—Workshop block, etc., at Thornton Heath Polytechnic; chief education officer, Katharine Street.

Dorchester.—Houses (52), various sites (£80,000); surveyor, Rural Council Offices, 53, High Street West.

Durham.—Additions to Alderman Wraith Grammar School (£45,000) and Bishop Auckland Girls' Grammar School (£15,000); county architect, Court Lane.

Easington.—Houses (258) for the R.D.C.; surveyor, Council Offices.

Farnborough.—Flats (100), Hawley Road and Hanley Lane (£106,778), for U.D.C.; S. A. Gregory, builder, Worthing.

Folkestone.—Proposed factory, East Cliff Works (£20,000); London Knitwear Co., Natal Road, Thornton Heath.

Ham (Surrey).—School (£39,455); county architect, County Hall, Kingston-upon-Thames.

Hanley.—Bus garage, Clough Street, for The Potteries Motor Traction Co.

Hastings.—Bus garage, Victoria Avenue, for East Kent Road Car Co., Ltd.

Hatfield.—Technical College for Herts E.C.; Easton & Robertson, architects, 54, Bedford Square, W.C.1.

Holmes Chapel.—Extensions to food factory, London Road, for Benger's Foods, Ltd.; F. J. Gibson (Builder), Ltd., 38a, Manchester Road, Wilmslow.

Lanarkshire.—School at Rutherglen for Lanarkshire Education Authority (£60,000); Myton, Ltd., Mossend, Bellshill, Lanarkshire, builders.

Leyton.—Day nursery and clinic, Lea Bridge Road, for T.C.; borough engineer.

Liverpool.—County primary school, Huyton-with-Roby (£170,540); G. Noel Hill, county architect, County Offices, Preston.

London.—ISLINGTON.—Flats, Sparsholt Road (66), St. John's College site (100), and Sickert Court (136) for Borough Council; H. Monson, architect, 120, Moorgate, E.C.2.

WOOLWICH.—HOUSES (112), Coldharbour estate; borough engineer.

CAMBERWELL.—Houses, Alder Street (24) and Lordship Lane (234), for Borough Council; John Grey & Partner, architects, 46, Oakley Street, S.W.3.

Louth.—New works on 50-acre site; Derbyshire Stone, Ltd., Smitterton Road, Matlock.

Lowestoft.—Houses (50); borough engineer.

Middlesbrough.—County primary school on the Thorntree estate for the E.C.; Allen & Hill, quantity surveyors, Tankerville Terrace, Newcastle-on-Tyne.

Houses (250); borough engineer.

Newcastle-on-Tyne.—Houses (400) for the City Council; city architect, 18, Cloth Market.

Shops, flats, offices and warehouses in Weidner Road, Denhill Park, West Road and Springhill Gardens; Hadden & Hillman, builders; New Bridge Street.

Nottingham.—Extensions to College of Arts and Crafts (£71,981); J. W. Stamp & Co., builders, Nuthall Road, Bobbers Mill.

Peterborough.—Houses (150), Dogsthorpe-Newark estate; A. J. Reeves, town clerk, Town Hall.

Rainow.—County primary school in Smithy Lane; E. M. Parkes, county architect, The Castle, Chester.

Rotherham.—Laboratory, Roundwood Colliery; National Coal Board, North-Eastern Division, Manvers Offices, Wath-on-Dearne.

Salford.—Primary and nursery schools for 440 children at Summerville Road, Pendleton; W. A. Walker, city engineer, Town Hall, Bexley Square.

Scunthorpe.—Houses (90) off Scotter Road; Spilman & Robertshaw, 3, Ashby Road.

Stockton-on-Tees.—Junior mixed school (320 places), Ragworth estate, and houses (50); borough architect, 124, High Street.

Surbiton.—School, Mansfield Road (£61,434); county architect, County Hall, Kingston-on-Thames.

Wallsend.—Storage depot at Oak Grove for Eldorado Ice Cream Co., Ltd.

Warrington.—Works, Ellesmere Street; T. Locker & Co., Ltd., wire cloth manufacturers, Church Street.

Watford.—Completion of Technical College for Herts E.C.; C. H. Aslin, county architect, Hertford.

West Hartlepool.—College of Further Education, for the E.C.; borough architect.

Wigan.—New operating theatre, Wigan Royal Infirmary, for Regional Hospitals Board.

Design of Domestic Appliances

How Housecraft Advisers Can Help

IT was a nice compliment by the Batti-Wallahs' Society to invite Miss Joan Whitgift, daughter of the late hon. secretary, Mr. Mark Whitgift, to address its members at last week's luncheon. Miss Whitgift, by her association with Central London Electricity, Ltd., and as first holder of the Caroline Haslett Trust, is well qualified to speak on electricity in the home, and at last week's lunch she explained the aims of electrical housecraft advisers.

Miss Whitgift said that the war had given housecraft advisers a real chance and their unbiased views had resulted in their obtaining the confidence of the housewife. They wanted to extend their influence so that any equipment of which they did not approve would not sell. It was time that poor apparatus now on sale was swept off the market.

Referring to the manuracture of electrical apparatus which was both mechanically and electrically sound, Miss Whitgift said that there were two faults. One was the lack of understanding by manufacturers of what their equipment was supposed to do, and the other was their lack of knowledge of tradition in home economics. Many of the ideas which tradition had handed down might not be good, but it would take a long time to eradicate them and in the meantime manufacturers should design their apparatus to meet the wishes of the housewife. Electrical housecraft advisers wanted to help manufacturers by pointing out such faults; if manufacturers would let them see their equipment in the "blueprint" stage the housecraft advisers could help by criticism, while they would continue to educate the public in the use of better modern equipment.